

UNCLASSIFIED

DEPARTMENT OF THE AIR FORCE
RDT&E DESCRIPTIVE SUMMARIES FOR

FY 2001 PRESIDENT'S BUDGET

VOLUME IIA



DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

FEBRUARY 2000

UNCLASSIFIED

20000313 113

TABLE OF CONTENTS

PE	PROGRAM ELEMENT TITLE	PAGE
#1 - Basic Research		
1 0601102F	Defense Research Sciences	1
#2 - Applied Research		
2 0602102F	Materials	43
3 0602201F	Aerospace Flight Dynamics	57
4 0602202F	Human Effectiveness Applied Research	73
5 0602203F	Aerospace Propulsion	93
6 0602204F	Aerospace Sensors	111
7 0602269F	Hypersonic Technology Program	133
8 0602601F	Space Technology	137
9 0602602F	Conventional Munitions	161
10 0602605F	DIRECTED ENERGY TECHNOLOGY	169
11 0602702F	Command Control and Communications	175
12 0602805F	Dual Use Science & Technology	191
#3 - Advanced Technology Development		
13 0603106F	Logistics Systems Technology	195
14 0603112F	Advanced Materials for Weapon Systems	199
15 0603202F	Aerospace Propulsion Subsystems Integration	211
16 0603203F	Advanced Aerospace Sensors	215
17 0603205F	Flight Vehicle Technology	227
18 0603211F	Aerospace Structures	233
19 0603216F	Aerospace Propulsion and Power Technology	237
20 0603227F	Personnel Training and Simulation Technology	247
21 0603231F	Crew Systems and Personnel Protection Technology	253
22 0603245F	Flight Vehicle Technology Integration	261
23 0603253F	Advanced Sensor Integration	265
24 0603270F	Electronic Combat Technology	271
25 0603302F	Space and Missile Rocket Propulsion	281

TABLE OF CONTENTS

	PROGRAM ELEMENT TITLE	PAGE
26	0603311F Ballistic Missile Technology	293
27	0603401F Advanced Spacecraft Technology	297
28	0603410F Space Systems Environmental Interactions Technology	321
29	0603444F MAUI SPACE SURVEILLANCE SYSTEMS	325
30	0603601F Conventional Weapons Technology	327
31	0603605F Advanced Weapons Technology	337
32	0603707F Weather Systems Technology	353
33	0603723F Environmental Engineering Technology	355
34	0603726F Aerospace Info Tech Sys Integration	359
35	0603728F Battlespace C2 Technology	369
36	0603789F C3I Advanced Development	377
37	0603876F Space Based Laser	389
#4 -	Demonstration and Validation	
38	0603260F Intelligence Advanced Development	395
39	0603319F Airborne Laser Technology	413
40	0603430F Advanced (EHF MILSATCOM (Space)	419
41	0603432F Polar MILSATCOM (Space)	425
42	0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)	431
43	0603438F Space Control Technology	439
44	0603441F Space Based IR Arch (Dem Val)(Space)	445
45	0603617F Command Control and Communication Applications	451
46	0603690F Information Operations Technology	471
47	0603742F Combat Identification Technology	475
48	0603790F NATO Cooperative R&D	483
49	0603800F Joint Strike Fighter	505
50	0603850F Integrated Broadcast Service (DEM/VAL)	517
51	0603851F ICBM - DEM/VAL	523
52	0603854F Wideband MILSATCOM (Space)	551
53	0603856F Air Force/National Program Cooperation (AFNPC)	571
54	0603859F Pollution Prevention	577

TABLE OF CONTENTS

	PE	PROGRAM ELEMENT TITLE	PAGE
55	0603860F	Joint Precision Approach and Landing Systems - Dem/Val	583
56	0604237F	Variable Stability In-Flight Simulation Test Aircraft	589
57	0604327F	Hardened Target Munitions	593
#5	Engineering and Manufacturing Development		
58	0207249F	Precision Attack Systems	599
59	0305176F	Combat Survivor Evader Locator	603
60	0604012F	Joint Helmet Mounted Cueing System (JHMCS)	609
61	0604201F	Integrated Avionics Planning and Development	615
62	0604222F	Nuclear Weapons Support	627
63	0604226F	B-1B	647
64	0604227F	Distributed Mission Training (DMT)	655
65	0604233F	Specialized Undergraduate Pilot Training	659
66	0604239F	F-22 EMD	675
67	0604240F	B-2 Advanced Technology Bomber	689
68	0604270F	EW Development	695
69	0604441F	Space Based Infrared Systems (SBIRS) High EMD	727
70	0604442F	Space Based Infrared Systems (SBIRS) Low	733
71	0604479F	MILSTAR LDR/MDR Sat Comm	739
72	0604600F	Munitions Dispenser Development	747
73	0604602F	Armament/Ordnance Development	753
74	0604604F	Submunitions	767
75	0604617F	Agile Combat Support	773
76	0604618F	Joint Direct Attack Munition	779
77	0604703F	Aeromedical Systems Development	785
78	0604706F	Life Support Systems	791
79	0604708F	Civil, Fire, Environmental, Shelter	799
80	0604727F	Joint Standoff Weapons Systems	807
81	0604735F	Combat Training Ranges	813
82	0604740F	Integrated Command & Control Applications	821
83	0604750F	Intelligence Equipment	831

TABLE OF CONTENTS

	PE	PROGRAM ELEMENT TITLE	PAGE
84	0604754F	Joint Tactical Information Distribution System	839
85	0604762F	Common Low Observable Verification Sys	853
86	0604779F	Joint Interoperability of Tactical Command/Control	859
87	0604800F	Joint Strike Fighter EMD	865
88	0604805F	Commercial Operations and Support Savings Initiative	871
89	0604851F	ICBM - EMD	877
90	0604853F	Evolved Expendable Launch Vehicle - EMD	901
91	0605011F	RDT&E For Aging Aircraft	907
#6 - Management and Support			
92	0604256F	Threat Simulator Development	913
93	0604258F	Target Systems Development	925
94	0604759F	Major T&E Investment	929
95	0605101F	RAND Project Air Force	939
96	0605306F	Ranch Hand II Epidemiology Study	943
97	0605712F	Initial Operational Test & Evaluation	947
98	0605807F	Test and Evaluation Support	957
99	0605808F	Development Planning	969
100	0605854F	Pollution Prevention	973
101	0605860F	Rocket Systems Launch Program (RSLP)	977
102	0605864F	Space Test Program	981
103	1001004F	International Activities	987
#7 - Operational System Development			
104	0101113F	B-52 SQUADRONS	995
105	0101120F	Advanced Cruise Missile	1,015
106	0101122F	Air Launched Cruise Missile	1,021
107	0102325F	Joint Surveillance System	1,029
108	0102326F	Region/ Sector Operations Control Center	1,035
109	0102411F	North Atlantic Defense System	1,041
110	0207027F	Air Space Command & Control Agency	1,047

TABLE OF CONTENTS

	PE	PROGRAM ELEMENT TITLE	PAGE
111	0207131F	A-10 SQUADRONS	1,053
112	0207133F	F-16 Squadrons	1,059
113	0207134F	F-15E SQUADRONS	1,067
114	0207136F	Manned Destructive Suppression	1,075
115	0207141F	F-117A Squadron	1,081
116	0207161F	Tactical AIM Missiles	1,087
117	0207163F	Advanced Medium Range Air-to-Air Missile	1,095
118	0207247F	Air Force TENCAP	1,101
119	0207253F	Compass Call	1,107
120	0207268F	Aircraft Engine Component Improvement Program (CIP)	1,111
121	0207320F	Sensor Fuzed Weapon (SFW)	1,117
122	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	1,123
123	0207412F	Theater Air Control Systems	1,129
124	0207414F	COMBAT INTELLIGENCE SYSTEM	1,135
125	0207417F	Airborne Warning and Control System (AWACS)	1,141
126	0207423F	Advanced Communications Systems	1,147
127	0207438F	Theater Battle Management (TBM) C4I	1,157
128	0207581F	JOINT STARS	1,177
129	0207590F	Seek Eagle	1,185
130	0207601F	USAF Modeling and Simulation	1,191
131	0207605F	Wargaming and Simulation Centers	1,199
132	0208006F	Mission Planning Systems	1,203
133	0208021F	Information Warfare Support	1,211
134	0208031F	WRM-EQUIPMENT/SECONDARY ITEMS	1,217
135	0208060F	Theater Missile Defenses	1,223
136	0302015F	E-4B NATIONAL AIRBORNE OPERATIONS CENTER	1,235
137	0303110F	Defense Satellite Communications System	1,241
138	0303112F	AIR FORCE COMMUNICATIONS	1,247
139	0303131F	Minimum Essential Emergency Communications Network (MEECN)	1,251
140	0303140F	Information Systems Security Program	1,267
141	0303141F	Global Combat Support System (GCSS)	1,283

TABLE OF CONTENTS

PE	PROGRAM ELEMENT TITLE	PAGE
142	0303150F WWMCCS/GLOBAL COMMAND & CONTROL SYSTEM	1,289
143	0303401F Communications Security	1,295
144	0303601F MILSATCOM Terminals	1,301
145	0305099F Global Air Traffic Management (GATM)	1,307
146	0305110F Satellite Control Network	1,325
147	0305111F Weather Service	1,333
148	0305114F Air Traffic Control/Approach/Landing System (ATCALS)	1,339
149	0305119F Medium Launch Vehicles	1,351
150	0305128F Security And Investigative Activities	1,357
151	0305137F National Airspace System	1,363
152	0305138F Inert Upper Stage (IUS)	1,369
153	0305144F Titan Space Launch Vehicles	1,375
154	0305158F Tactical Terminals	1,381
155	0305160F Defense Meteorological Satellite Program	1,385
156	0305164F NAVSTAR Global Positioning System (User EQ) Space)	1,393
157	0305165F NAVSTAR GPS (Space)	1,403
158	0305182F Spacelift Range System	1,411
159	0305202F Dragon U-2 (JMIP)	1,419
160	0305205F Endurance Unmanned Aerial Vehicles	1,427
161	0305206F Airborne Reconnaissance Systems	1,453
162	0305207F Manned Reconnaissance System	1,475
163	0305208F Distributed Common Ground Systems	1,487
164	0305906F NCMC - TW/AA System	1,499
165	0305910F SPACETRACK	1,519
166	0305911F Defense Support Program	1,535
167	0305913F NUDET Detection System (Space)	1,547
168	0305917F Space Architect	1,553
169	0308601F Modeling and Simulation Support	1,559
170	0308699F Shared Early Warning System	1,567
171	0401115F C-130 AIRLIFT SQUADRONS	1,573
172	0401119F C-5 Airlift Squadrons	1,583

TABLE OF CONTENTS

	PE	PROGRAM ELEMENT TITLE	PAGE
173	0401130F	C-17 Aircraft	1,595
174	0401214F	Air Cargo Materiel Handling (463-L)	1,607
175	0401218F	KC-135s	1,611
176	0401219F	KC-10S	1,617
177	0404011F	Special Operations Forces	1,623
178	0702207F	Depot Maintenance (Non-IF)	1,629
179	0708011F	Industrial Preparedness	1,635
180	0708026F	Productivity, Reliability, Availability, Maintainability Program	1,641
181	0708071F	Joint Logistics Program - Ammunition System	1,647
182	0708611F	Support Systems Development	1,653
183	0708612F	Computer Resources Support Improvement Program	1,669
184	0901218F	Civilian Compensation Program	1,675
185	1001018F	NATO AGS	1,679

Other Exhibits

Military Construction Project Data (DD Form 1391)
Combating Terrorism Exhibit

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
A-10 SQUADRONS	0207131F	1,053
Advanced (EHF) MILSATCOM (Space)	0603430F	419
Advanced Aerospace Sensors	0603203F	215
Advanced Communications Systems	0207423F	1,147
Advanced Cruise Missile	0101120F	1,015
Advanced Materials for Weapon Systems	0603112F	199
Advanced Medium Range Air-to-Air Missile	0207163F	1,095
Advanced Sensor Integration	0603253F	265
Advanced Spacecraft Technology	0603401F	297
Advanced Weapons Technology	0603605F	337
Aeromedical Systems Development	0604703F	785
Aerospace Flight Dynamics	0602201F	57
Aerospace Info Tech Sys Integration	0603726F	359
Aerospace Propulsion	0602203F	93
Aerospace Propulsion and Power Technology	0603216F	237
Aerospace Propulsion Subsystems Integration	0603202F	211
Aerospace Sensors	0602204F	111
Aerospace Structures	0603211F	233
Agile Combat Support	0604617F	773
Air Cargo Materiel Handling (463-L)	0401214F	1,607
AIR FORCE COMMUNICATIONS	0303112F	1,247
Air Force TENCAP	0207247F	1,101
Air Force/National Program Cooperation (AFNPC)	0603856F	571
Air Launched Cruise Missile	0101122F	1,021
Air Space Command & Control Agency	0207027F	1,047
Air Traffic Control/Approach/Landing System (ATCALS)	0305114F	1,339
Airborne Laser Technology	0603319F	413
Airborne Reconnaissance Systems	0305206F	1,453
Airborne Warning and Control System (AWACS)	0207417F	1,141
Aircraft Engine Component Improvement Program (CIP)	0207268F	1,111
Armament/Ordnance Development	0604602F	753

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
B-1B	0604226F	647
B-2 Advanced Technology Bomber	0604240F	689
B-52 SQUADRONS	0101113F	995
Ballistic Missile Technology	0603311F	293
Battlespace C2 Technology	0603728F	369
C-130 AIRLIFT SQUADRONS	0401115F	1,573
C-17 Aircraft	0401130F	1,595
C3I Advanced Development	0603789F	377
C-5 Airlift Squadrons	0401119F	1,583
Civil, Fire, Environmental, Shelter	0604708F	799
Civilian Compensation Program	0901218F	1,675
Combat Identification Technology	0603742F	475
COMBAT INTELLIGENCE SYSTEM	0207414F	1,135
Combat Survivor Evader Locator	0305176F	603
Combat Training Ranges	0604735F	813
Command Control and Communication Applications	0603617F	451
Command Control and Communications	0602702F	175
Commercial Operations and Support Savings Initiative	0604805F	871
Common Low Observable Verification Sys	0604762F	853
Communications Security	0303401F	1,295
Compass Call	0207253F	1,107
Computer Resources Support Improvement Program	0708612F	1,669
Conventional Munitions	0602602F	161
Conventional Weapons Technology	0603601F	327
Crew Systems and Personnel Protection Technology	0603231F	253
Defense Meteorological Satellite Program	0305160F	1,385
Defense Research Sciences	0601102F	1
Defense Satellite Communications System	0303110F	1,241
Defense Support Program	0305911F	1,535
Depot Maintenance (Non-IF)	0702207F	1,629
Development Planning	0605808F	969

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
DIRECTED ENERGY TECHNOLOGY	0602605F	169
Distributed Common Ground Systems	0305208F	1,487
Distributed Mission Training (DMT)	0604227F	655
Dragon U-2 (JMIP)	0305202F	1,419
Dual Use Science & Technology	0602805F	191
E-4B NATIONAL AIRBORNE OPERATIONS CENTER	0302015F	1,235
Electronic Combat Technology	0603270F	271
Endurance Unmanned Aerial Vehicles	0305205F	1,427
Environmental Engineering Technology	0603723F	355
Evolved Expendable Launch Vehicle - EMD	0604853F	901
EW Development	0604270F	695
F-117A Squadron	0207141F	1,081
F-15E SQUADRONS	0207134F	1,067
F-16 Squadrons	0207133F	1,059
F-22 EMD	0604239F	675
Flight Vehicle Technology	0603205F	227
Flight Vehicle Technology Integration	0603245F	261
Global Air Traffic Management (GATM)	0305099F	1,307
Global Combat Support System (GCSS)	0303141F	1,283
Hardened Target Munitions	0604327F	593
Human Effectiveness Applied Research	0602202F	73
Hypersonic Technology Program	0602269F	133
ICBM - DEM/VAL	0603851F	523
ICBM - EMD	0604851F	877
Industrial Preparedness	0708011F	1,635
Inert Upper Stage (IUS)	0305138F	1,369
Information Operations Technology	0603690F	471
Information Systems Security Program	0303140F	1,267
Information Warfare Support	0208021F	1,211
Initial Operational Test & Evaluation	0605712F	947
Integrated Avionics Planning and Development	0604201F	615

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
Integrated Broadcast Service (DEM/VAL)	0603850F	517
Integrated Command & Control Applications	0604740F	821
Intelligence Advanced Development	0603260F	395
Intelligence Equipment	0604750F	831
International Activities	1001004F	987
Joint Air-to-Surface Standoff Missile (JASSM)	0207325F	1,123
Joint Direct Attack Munition	0604618F	779
Joint Helmet Mounted Cueing System (JHMCS)	0604012F	609
Joint Interoperability of Tactical Command/Control	0604779F	859
Joint Logistics Program - Ammunition System	0708071F	1,647
Joint Precision Approach and Landing Systems - Dem/Val	0603860F	583
Joint Standoff Weapons Systems	0604727F	807
JOINT STARS	0207581F	1,177
Joint Strike Fighter	0603800F	505
Joint Strike Fighter EMD	0604800F	865
Joint Surveillance System	0102325F	1,029
Joint Tactical Information Distribution System	0604754F	839
KC-10S	0401219F	1,617
KC-135s	0401218F	1,611
Life Support Systems	0604706F	791
Logistics Systems Technology	0603106F	195
Major T&E Investment	0604759F	929
Manned Destructive Suppression	0207136F	1,075
Manned Reconnaissance System	0305207F	1,475
Materials	0602102F	43
MAUI SPACE SURVEILLANCE SYSTEMS	0603444F	325
Medium Launch Vehicles	0305119F	1,351
MILSATCOM Terminals	0303601F	1,301
MILSTAR LDR/MDR Sat Comm	0604479F	739
Minimum Essential Emergency Communications Network (MEECN)	0303131F	1,251
Mission Planning Systems	0208006F	1,203

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
Modeling and Simulation Support	0308601F	1,559
Munitions Dispenser Development	0604600F	747
National Airspace System	0305137F	1,363
National Polar-Orbiting Operational Environmental Satellite System (NPOESS)	0603434F	431
NATO AGS	1001018F	1,679
NATO Cooperative R&D	0603790F	483
NAVSTAR Global Positioning System (User EQ) Space)	0305164F	1,393
NAVSTAR GPS (Space)	0305165F	1,403
NCMC - TW/AA System	0305906F	1,499
North Atlantic Defense System	0102411F	1,041
Nuclear Weapons Support	0604222F	627
NUDET Detection System (Space)	0305913F	1,547
Personnel Training and Simulation Technology	0603227F	247
Polar MILSATCOM (Space)	0603432F	425
Pollution Prevention	0603859F	577
Pollution Prevention	0605854F	973
Precision Attack Systems	0207249F	599
Productivity, Reliability, Availability, Maintainability Program	0708026F	1,641
Ranch Hand II Epidemiology Study	0605306F	943
RAND Project Air Force	0605101F	939
RDT&E For Aging Aircraft	0605011F	907
Region/ Sector Operations Control Center	0102326F	1,035
Rocket Systems Launch Program (RSLP)	0605860F	977
Satellite Control Network	0305110F	1,325
Security And Investigative Activities	0305128F	1,357
Seek Eagle	0207590F	1,185
Sensor Fuzed Weapon (SFW)	0207320F	1,117
Shared Early Warning System	0308699F	1,567
Space and Missile Rocket Propulsion	0603302F	281
Space Architect	0305917F	1,553
Space Based Infrared Systems (SBIRS) High EMD	0604441F	727

ALPHABETICAL LISTING

Program Element Title	PE	PAGE
Space Based Infrared Systems (SBIRS) Low	0604442F	733
Space Based IR Arch (Dem Val)(Space)	0603441F	445
Space Based Laser	0603876F	389
Space Control Technology	0603438F	439
Space Systems Environmental Interactions Technology	0603410F	321
Space Technology	0602601F	137
Space Test Program	0605864F	981
Spacelift Range System	0305182F	1,411
SPACETRACK	0305910F	1,519
Special Operations Forces	0404011F	1,623
Specialized Undergraduate Pilot Training	0604233F	659
Submunitions	0604604F	767
Support Systems Development	0708611F	1,653
Tactical AIM Missiles	0207161F	1,087
Tactical Terminals	0305158F	1,381
Target Systems Development	0604258F	925
Test and Evaluation Support	0605807F	957
Theater Air Control Systems	0207412F	1,129
Theater Battle Management (TBM) C4I	0207438F	1,157
Theater Missile Defenses	0208060F	1,223
Threat Simulator Development	0604256F	913
Titan Space Launch Vehicles	0305144F	1,375
USAF Modeling and Simulation	0207601F	1,191
Variable Stability In-Flight Simulation Test Aircraft	0604237F	589
Wargaming and Simulation Centers	0207605F	1,199
Weather Service	0305111F	1,333
Weather Systems Technology	0603707F	353
Wideband MILSATCOM (Space)	0603854F	551
WRM-EQUIPMENT/SECONDARY ITEMS	0208031F	1,217
WWMCCS/GLOBAL COMMAND & CONTROL SYSTEM	0303150F	1,289

UNCLASSIFIED

Fiscal Year 2001 Budget Estimate Submission
RDT&E Descriptive Summaries, Volume II
February 2000

INTRODUCTION AND EXPLANATION OF CONTENTS

1. (U) GENERAL. This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) program elements and projects in the FY2001 President's Budget Submission (PB). All formats in this document are in accordance with the guidelines of the DoD Financial Management Regulation, Volume 2B, Chapter 5 with the exception of the R-3 exhibit. The Air Force could not support the format matrix because our programs do not track their programs in the manner required to complete the exhibit.

- a. Contents: Exhibits R-2, R-2a and R-3 provide narrative information for all RDT&E program elements and projects within the USAF FY 2001 RDT&E program except the classified program elements. The formats and contents of this document are in accordance with the guidelines and requirement of the Congressional committees insofar as possible. The F-22 "P-5" budget exhibit directed by the Authorization Conference Report number 106-371 has been inserted behind the R-3 exhibit for program element 0604239F.
- b. The "Other Program Funding Summary" portion of the R-2 includes, in addition to RDT&E funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.
- c. The Justification book has been assembled in accordance with DoD Financial Management Regulation 7000.14, Vol. 2B Cpt 5, Sec 050302 with the exception of the R-1; Project Funding Listing which was distributed under a separate cover due to classification.

2. (U) CLASSIFICATION.

- a. All exhibits contained in Volumes I, II and III are UNCLASSIFIED. Classified exhibits are not included in the submission due to the level of security classification and necessity of special security clearances.

PROGRAM ELEMENT COMPARISON SUMMARY
INTRODUCTION AND EXPLANATION OF CONTENTS

Program Element	Remarks
BUDGET ACTIVITY 1: BASIC RESEARCH	
BUDGET ACTIVITY 2: APPLIED RESEARCH	
0602202F, Human Effectiveness Applied Research	Project 6219 was terminated after FY 1999, but Congress added funding in FY 2000.
0602269F, Hypersonic Technology Program	Project 1025 funding for this program in FY01 is contained in PEs 0602203F Aerospace Propulsion, 0603203F Aerospace Propulsion Subsystems Integration and 0603216F Aerospace Propulsion and Power Technology.
0602601F, Space Technology	Project 1011 all rocket propulsion efforts will be transferred to 0602203F, Project 4847. Project 3326 all lasers and imaging efforts will be transferred to PE 0602605F, Projects 4866 and 4867.
0602605F, Directed Energy Technology	Projects 4866 and 4867 were transferred from PE 0602601F.
0602702F, Command, Control and Communications	Project 4506, Surveillance Technology will be transferred to Project 4594, PE 0602702F and Project 7622, PE 0602204F beginning in FY01.
BUDGET ACTIVITY 3: ADVANCED TECHNOLOGY DEVELOPMENT	
0603726F, Aerospace Information Technology Systems Integration	In FY 2001, the efforts in Project 632863, Integrated Photonics, will be conducted in PE 0603203F, Project 63665A. Prior to FY 2001, the efforts in Project 634850, Collaborative C2, were performed in PE 0603253F, Projects 632735 and 63666A.
BUDGET ACTIVITY 4: DEMONSTRATION AND VALIDATION	
0603441F, Space Based IR Arch (Dem/Val)	SBIRS Low efforts performed in Project 0007 will be transferred to PE 0604442F, Project 4598 in FY00 and 01.
0603800F, Joint Strike Fighter	Project 2025 will complete in FY01.

PROGRAM ELEMENT COMPARISON SUMMARY
INTRODUCTION AND EXPLANATION OF CONTENTS

Program Element	Remarks
BUDGET ACTIVITY 4: DEMONSTRATION AND VALIDATION Continued	
0603854F, Wideband Milsatcom	Project 4870 is a FY01 new start.
0603856F, Air Force/NRO Partnership	Project 4782, the Air Force/National Program Cooperation (AFNPC) effort is a FY01 new start.
0603859F, Pollution Prevention	Project 4852, Pollution Prevention will be transferred from PE 0605854F, previously in Budget Activity 6 beginning in FY01.
BUDGET ACTIVITY 5: ENGINEERING AND MANUFACTURING DEVELOPMENT	
0207249F, Precision Attack Systems Procurement	Project 2693 is a FY01 new start.
0604012F, Joint Helmet Mounted Cueing System	Project 4789 the Joint Helmet Mounted Cueing Systems effort is a FY01 new start.
0604201F, Integrated Avionics Planning and Development	Project 2257 will complete in FY01.
0604270F, EW Development	Project 8462 is a FY01 new start.
0604602F, Armament Ordnance Development	Project 3133 will complete in FY01.
0604327F, Hardened Target Munitions	Project 4641 will complete in FY00.
0604617F, Agile Combat Support	Project 2895 will complete in FY01.
0604706F, Life Support System	Project 412A, the K-36/3.5A Ejection Seat effort is a FY01 new start.
0604754F, Joint Tacital Information Distribution System	Project 4749, the Air Defense System Integrator effort is a FY01 new start
0604851F, ICBM	Project 4210 completes in FY00.
BUDGET ACTIVITY 6: MANAGEMENT AND SUPPORT	
0604256F, Threat Simulator Development	Project 3321, Joint Modeling and Simulation System (JMASS) funding and responsibility transferred in FY00 to PE 0207601F.

PROGRAM ELEMENT COMPARISON SUMMARY
INTRODUCTION AND EXPLANATION OF CONTENTS

Program Element	Remarks
BUDGET ACTIVITY 6: MANAGEMENT AND SUPPORT Continued	
0604256F, Threat Simulator Development	Project 7500, Foreign Materiel Acquisition and Exploitation (FMA/E) established a funding line in FY00.
0605808F, Development Planning	PE terminated in FY00.
0604759F, Major T&E Investment	Project 4759, two I&M projects started in FY00: Modeling & Simulation T&E Resources (MASTER); and Seeker T&E.
0604759F, Major T&E Investment	Project 4759, the Advanced Range Telemetry Integration (ARTM) was developed by CTEIP (OSD PE 0604940D). The ARTM I&S (Integration and Support) funding in this PE begins in FY01. Integrates the OSD developed ARTM into the Edwards AFB range.
0605854F, Pollution Prevention	Program moved into Budget Activity 4, to PE 0603859F beginning in FY01.
BUDGET ACTIVITY 7: OPERATIONAL SYSTEM DEVELOPMENT	
0101120F, Advanced Cruise Missile	Project 4798, the AGM-129A Advanced Cruise Missile Service Life Extension Program effort is a FY01 new start.
0207133F, F-16 Squadrons	Project 2671, the Automated Ground Collision Avoidance system, Falcon Star, and Targeting Pod/HARM Targeting Systems efforts are FY01 new starts.
0207141F, F-117A Squadrons	Project 3956, the F-117 Enhanced GBU-27 effort is a FY01 new start.
0303140F, Information Systems Security Program	Project 4585, Cryptologic 2020, will be funded under PE 33401F, Comm Sec, Project 4861, Cryptologic 2020, beginning in FY01.
0303601F, Milsatcom Terminals	Project 2487, the Airborne Wideband Terminal and Ground Multiband Terminal effort are a FY01 new start.
0305205F, Endurance Unmanned Aerial Vehicles	Project 4883 is a FY01 new start. Project 4816 will merge into 4799 in FY00.

PROGRAM ELEMENT COMPARISON SUMMARY

INTRODUCTION AND EXPLANATION OF CONTENTS

Program Element	Remarks
BUDGET ACTIVITY 7: OPERATIONAL SYSTEM DEVELOPMENT Continued	
0305206F, Airborne Reconnaissance System	Project 4882 is a FY01 new start.
0305207F, Manned Reconnaissance system	Project 4820 will be transferred to PE 0305202F beginning in FY01.
0305910F, Spacetrack	Project 4791, the Ground-Based Electro-Optical Deep Space Surveillance Sustainment effort is a FY00 new start.
0401115F, C-130 Airlift Squadrons	Project 4885 is a FY01 new start.
0401130F, C-17 Aircraft	Project 4886 is a FY01 new start.
0404011F, Special Operations Forces	Project 4860 is a FY01 new start.
0708612F, Computer Resources Support Improvement Program	FY01 funding was moved to this PE from PE 0708611F, Project 67309.
1001018F, NATO Joint Stars	Project 0002, the Project Definition of NATO Advanced Trans Atlantic Radar Project effort is a FY01 new start pending Congressional approval.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE											
04 - Demonstration and Validation		0603260F Intelligence Advanced Development											
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost			
Total Program Element (PE) Cost		3,819	4,498	4,401	4,455	4,543	4,634	4,726	Continuing	TBD			
643479	Advanced Sensor Exploitation	814	797	779	816	816	833	848	Continuing	TBD			
643480	Automated Imagery Exploitation	775	1,287	1,256	1,313	1,311	1,338	1,364	Continuing	TBD			
643481	Knowledge Based Tech For Intelligence	1,118	1,313	1,287	1,343	1,352	1,378	1,407	Continuing	TBD			
643482	Science & Tech Intelligence Methodology	1,112	1,101	1,079	983	1,064	1,085	1,107	Continuing	TBD			
Quantity of RDT&E Articles		0	0	0	0	0	0	0	0	0			
(U) A. Mission Description													
(U) Intelligence Advanced Development (IAD) demonstrates and validates advanced technology required to support warfighter needs for timely all source intelligence information. IAD research supports global awareness, consistent battlespace knowledge, precision information, and the execution of time critical missions. IAD projects provide better on-time information to the warfighter using new and existing data sources, streamline data analysis, reduce footprint required, extend life of sensors in place and enhance performance. Air Force Research Lab Rome Research Site (AFRL/IFE) works directly with users, employing a rapid prototyping evolutionary approach, integrating finished modules directly into the field. The programs are oriented toward specific shortfalls and deficiencies as documented by the major commands (MAJCOMS), unified commands, and intelligence organizations in their mission and function area plans. The goal of this program is to expedite technology transition from the laboratory to operational use via rapid prototyping. This AF program is focused on technology insertion to correct AF intelligence deficiencies at tactical or operation levels. This program bridges the transition of Advance Technology Demonstrations (ATDs), Integrated Technology Thrust Programs (ITTPs), and supports Defense Technology Objectives (DTOs).													
(U) B. Budget Activity Justification													
This program is in Demonstration and Validation, Budget Activity 4, because it demonstrates and validates advanced technology which enhances information / intelligence systems capabilities and techniques.													

Exhibit R-2 (PE 0603260F)

Page 1 of 18 Pages

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000		
BUDGET ACTIVITY		PE NUMBER AND TITLE			
04 - Demonstration and Validation		0603260F Intelligence Advanced Development			
(U)	C. Program Change Summary (\$ in Thousands)	FY 1999	FY 2000	FY 2001	Total Cost
(U)	Previous President's Budget (FY 2000 PBR)	4,602	4,534	4,442	TBD
(U)	Appropriated Value	4,615	4,534		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-13			
	b. Small Business Innovative Research	-125			
	c. Omnibus or Other Above Threshold Reprogram		-36		
	d. Below Threshold Reprogram	-637			
	e. Rescissions	-21			
	f. Other				
(U)	Adjustments to Budget Years Since FY 2000 PBR			-41	
(U)	Current Budget Submit/FY 2001 PBR	3,819	4,498	4,401	TBD
(U)	Significant Program Changes:				
	None				

Page 2 of 18 Pages

Exhibit R-2 (PE 0603260F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE		February 2000	
BUDGET ACTIVITY			PE NUMBER AND TITLE				PROJECT						
04 - Demonstration and Validation			0603260F Intelligence Advanced Development				643479						
COST (\$ in Thousands)			FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
643479	Advanced Sensor Exploitation		814	797	779	816	816	833	848	Continuing	TBD		
(U)	A. Mission Description												
	The project objectives are to develop, demonstrate and evaluate a near-real-time all source correlation/fusion capability by applying state-of-the-art data processing techniques for the receipt, correlation, templating and analysis of battlefield information. Capabilities will be developed in open systems architecture environment allowing for the greatest efficiency in terms of integrating or interfacing with other systems. There is an Air Force, DoD and Coalition need to correlate various sources of intelligence information (Communications Intelligence - COMINT, Electronic Intelligence - ELINT, Image Intelligence - IMINT) within seconds as opposed to hours with current manual methods. Project includes development of data correlation and predictive intelligence algorithms, target analysis and prioritization, air order of battle updates and tactical analysis techniques. This computerized approach will speed up the correlation of data from diverse sources of intelligence information, including COMINT, ELINT, and IMINT; providing faster situational awareness and threat assessment and replace manual systems with automated capabilities												
(U)	FY 1999 (\$ in Thousands)												
(U)	\$398	Completed Consistent Operational Picture Via Distributed Fusion for Global Awareness.											
(U)	\$198	Completed Enhanced Analytical Tools to Support Dynamic Situation Awareness.											
(U)	\$218	Completed Predictive Fusion Algorithms to Support Dynamic Planning and Execution.											
(U)	\$814	Total											
(U)	FY 2000 (\$ in Thousands)												
(U)	\$210	Initiate Network Centric Information Fusion to support Dynamic Planning and Execution.											
(U)	\$194	Initiate Data Fusion Architecture for Global Awareness.											
(U)	\$393	Initiate Consistent Battlespace Picture Build II to support Dynamic Planning and Execution.											
(U)	\$797	Total											
(U)	FY 2001 (\$ in Thousands)												
(U)	\$393	Complete Network Centric Information to Support Dynamic Planning and Execution.											
(U)	\$193	Continue Data Fusion Architecture for Global Awareness.											
(U)	\$193	Continue Consistent Battlespace Picture Build II to support Dynamic Planning and Execution.											
(U)	\$779	Total											

Project 643479

Page 3 of 18 Pages

Exhibit R-2A (PE 0603260F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					February 2000		643479		
PE NUMBER AND TITLE									
(U)	B. Project Change Summary								
	Not Applicable								
(U)	C. Other Program Funding Summary (\$ in Thousands)								
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost
	Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	
(U)	RELATED ACTIVITIES								
	62720F C31 Exploratory Development: information exploitation (imagery/video/text), multi-sensor collaboration, global information base.								
	63789F C3 Advanced Technology Development: correlation, fusion algorithms, visualization.								
	63726F C3 Subsystem Integration: advanced information applications, advanced memory technology.								
	64750F Intelligence Equipment: modeling and simulation, foreign threat assessment.								
	31335F Intelligence Data Handling: enhances DoD Intelligence Information Systems (DoDIIS).								
(U)	D. Acquisition Strategy								
	All major contracts within this Program Element were awarded after full and open competition.								
(U)	E. Schedule Profile								
	FY 1999				FY 2000		FY 2001		
	1	2	3	4	1	2	3	4	
(U)	Consistent Operational Picture, Via Distributed Fusion Completed				*				
(U)	Enhanced Analytical Tools Completed				*				
(U)	Predictive Fusion Algorithms Completed				*				
(U)	Network Centric Information Fusion Initiated								X
(U)	Data Fusion Architecture Initiated								X
(U)	Consistence Battlespace Picture Build II Initiated								X
	* - Denotes completed event								
	X - Denotes planned event								

Project 643479

Page 4 of 18 Pages

Exhibit R-2A (PE 0603260F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
04 - Demonstration and Validation		0603260F Intelligence Advanced Development		643479	
(U)	A. Project Cost Breakdown (\$ in Thousands)				
			FY 1999	FY 2000	FY 2001
(U)	Consistent Operational Picture via Distributed Fusion		398		
(U)	Enhanced Analytical Tools		198		
(U)	Predictive Fusion Algorithms		218	210	193
(U)	Network Centric Information Fusion			194	393
(U)	Consistent Battlespace Picture Build II			393	193
(U)	Total		814	797	779
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)				
(U)	Performing Organizations:				
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC
	Product Development Organizations			Budget FY 1999	Budget FY 2000
	Electric Computing Concepts CPFF				Budget to Complete
	96-C-0045			350	0
	BTG, Inc 97-C-0341	CPFF		398	210
	BTG, Inc	CPFF		198	194
	97-C-0341			218	393
	Contractor TBD	TBD		0	0
	Contractor TBD	TBD		0	0
	Support and Management Organizations			0	193
	N/A			0	193
	Test and Evaluation Organizations			0	0
	N/A			0	0
Project 643479		Page 5 of 18 Pages		Exhibit R-3 (PE 0603260F)	

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT
04 - Demonstration and Validation		0603260F Intelligence Advanced Development					643479
(U)	<u>Government Furnished Property:</u>						
	<u>Contract</u>						
	<u>Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Delivery Date</u>				
Item Description				<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget to Complete</u>
Product Development Property							<u>Total Program</u>
N/A							
Support and Management Property							
Test and Evaluation Property							
Subtotals				<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget to Complete</u>
Subtotal Product Development				450	814	797	TBD
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project				450	814	797	TBD

Project 643479
Page 6 of 18 Pages
Exhibit R-3 (PE 0603260F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603260F Intelligence Advanced Development								643480	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
643480	Automated Imagery Exploitation	775	1,287	1,256	1,313	1,311	1,338	1,364	Continuing	TBD	
(U)	A. Mission Description This project demonstrates and validates the capability to more accurately and quickly interpret digital imagery and video by evaluating computer assisted techniques to manipulate and overlay imagery, cartographic data, signal intelligence (SIGINT), and on line intelligence data. The result of this effort will be more precise target locations and identifications, precise target reference scenes, and more accurate damage assessments; all developed for easy supportability on low cost commercially available computer workstations										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$264	Completed Multi-Processor development for Automated Image Exploitation.									
(U)	\$189	Completed Speech Technology for Image Exploitation.									
(U)	\$161	Completed Techniques for Secure Image Information Dissemination - Secure Steganography.									
(U)	\$161	Continued Distributed Imagery Information Systems Integration in support of Information Superiority (Phase 2).									
(U)	\$775	Total									
(U)	FY 2000 (\$ in Thousands)										
(U)	\$856	Continue Distributed Imagery Information Systems Integration in support of Information Superiority (Phases 3, 4, and 5).									
(U)	\$431	Initiate Multi-Spectral/Hyper Spectral Image Exploitation Applications									
(U)	\$1,287	Total									
(U)	FY 2001 (\$ in Thousands)										
(U)	\$867	Complete Distributed Imagery Information Systems Integration in support of Information Superiority (Phases 3, 4, and 5).									
(U)	\$389	Continue Multi-Spectral / Hyper-Spectral Image Exploitation Applications.									
(U)	\$1,256	Total									
(U)	B. Project Change Summary Not Applicable										

Project 643480

Page 7 of 18 Pages

Exhibit R-2A (PE 0603260F)

401

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY						DATE		PROJECT	
04 - Demonstration and Validation						0603260F Intelligence Advanced Development		February 2000 643480	
PE NUMBER AND TITLE									
C. Other Program Funding Summary (\$ in Thousands)									
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost
	Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	
Related Activities:									
62720F C3I Exploratory Development: information exploitation (imagery / video / text), multi-sensor collaboration, global information base.									
63789F C3 Advanced Technology Development: correlation, fusion algorithms, visualization.									
63726F C3 Subsystem Integration: advanced imagery/information applications, advanced memory technology.									
64750F Intelligence Equipment: modeling and simulation, foreign threat assessment.									
31335F Intelligence Data Handling: enhances DoD Intelligence Information Systems (DoDIIS).									
D. Acquisition Strategy									
All major contracts within this Program Element were awarded after full and open competition.									
E. Schedule Profile									
	FY 1999			FY 2000			FY 2001		
	1	2	3	4	1	2	3	4	
(U) Multi Processors for Automated Image Exploitation Completed		*							
(U) Speech Technology for Image Exploitation Completed				*					
(U) Secure Image Information Dissemination Completed				*					
(U) Multi Spectral / Hyper Spectral Image Applications Initiated					*				
(U) Distributed Imagery Information System Complete									X
* - Denotes completed event									
X - Denotes planned event									

Project 643480

Page 8 of 18 Pages

Exhibit R-2A (PE 0603260F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE		0603260F Intelligence Advanced Development 643480		
04 - Demonstration and Validation						
(U)	A. Project Cost Breakdown (\$ in Thousands)					
				FY 1999	FY 2000	FY 2001
(U)	Multi Processor for Automated Image Exploitation			264		
(U)	Speech Technology for Image Exploitation			189		
(U)	Secure Image Information Dissemination			161		
(U)	Distributed Imagery Information System Integration			161	856	867
(U)	Multi Spectral / Hyper Spectral Image Exploitation Applications				431	389
(U)	Total			775	1,287	1,256
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)					
(U)	Performing Organizations:					
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Program
	Product Development Organizations					
	Nichols Research 96-C-0083	CPFF	May 96	0	0	TBD
	State University of New York CPFF at Binghamton	CPFF	Jun 96	0	0	TBD
	97-C-0105	CPFF	Feb 98	0	0	TBD
	PAR, Inc.	CPFF	Jun 98	0	0	TBD
	98-C-0166	TBD	TBD	0	0	TBD
	PAR, Inc.	TBD	TBD	0	0	TBD
	State University of New York at Binghamton	TBD	TBD	0	0	TBD
	Synectics	TBD	TBD	0	0	TBD
	Support and Management Organizations			0	0	TBD
	N/A			0	0	TBD
	Test and Evaluation Organizations			0	0	TBD
	N/A			0	0	TBD
Project 643480				Page 9 of 18 Pages		
				Exhibit R-3 (PE 0603260F)		

403

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000		PROJECT				
BUDGET ACTIVITY										PE NUMBER AND TITLE		0603260F Intelligence Advanced Development				643480	
04 - Demonstration and Validation																	
(U) Government Furnished Property:																	
Contract																	
Method/Type Award or																	
or Funding Obligation																	
Vehicle Date																	
Product Development Property																	
N/A																	
Support and Management Property																	
N/A																	
Test and Evaluation Property																	
N/A																	
Subtotals																	
Subtotal Product Development																	
Subtotal Support and Management																	
Subtotal Test and Evaluation																	
Total Project																	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603260F Intelligence Advanced Development								643481	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
643481	Knowledge Based Tech For Intelligence	1,118	1,313	1,287	1,343	1,352	1,378	1,407	Continuing	TBD	
(U)	<u>A. Mission Description</u>										
	This project will improve Global Awareness, Dynamic Planning and Execution, providing knowledge bases and inference engines to exploit collected data to nine major commands on AF intelligence organizations. The development of the analytical aids is based on artificial intelligence techniques. The increased timeliness, efficiency and effectiveness derived will provide warning time and accuracy, allowing national/military authorities a greater range of options to avert, diminish or control a crisis.										
(U)	<u>FY 1999 (\$ in Thousands)</u>										
(U)	\$242	Completed Enhancing Intelligence Analysts Productivity at AIA.									
(U)	\$274	Continued Machine Learning Prototype, expert system and neural network technologies to support real-time analysis of timelines.									
(U)	\$307	Continued Multimedia for Information Access for warfighters and analysts at AIA and users of Imagery.									
(U)	\$295	Continued Intelligence Application Browser Interfaces for warfighters and analysts at ACC and AIA.									
(U)	\$1,118	Total									
(U)	<u>FY 2000 (\$ in Thousands)</u>										
(U)	\$488	Complete Machine Learning Prototype, expert system and neural network technologies to support real-time analysis of timelines.									
(U)	\$488	Continue Multimedia for Information Access for analysts at AIA and users of Imagery.									
(U)	\$337	Continue Intelligence Application Browser Interfaces for warfighters and analysts at ACC and AIA.									
(U)	\$1,313	Total									
(U)	<u>FY 2001 (\$ in Thousands)</u>										
(U)	\$488	Complete Multimedia for Information Access for analysts at AIA and users of Imagery.									
(U)	\$488	Continue Intelligence Application Browser Interfaces for warfighters and analysts at ACC and AIA.									
(U)	\$311	Initiate Secure Information Delivery by developing a Broadsword trusted transfer agent.									
(U)	\$1,287	Total									
(U)	<u>B. Project Change Summary</u>										
	Not Applicable										

Project 643481

Page 11 of 18 Pages

Exhibit R-2A (PE 0603260F)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603260F Intelligence Advanced Development								643481	
(U)	C. Other Program Funding Summary (\$ in Thousands)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost	
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate			
(U)	Related Activities:										
	62720F C3I Exploratory Development: information exploitation (imagery/video/text), multi-sensor collaboration, global information base.										
	63789F C3 Advanced Technology Development: correlation, fusion algorithms, visualization.										
	63726F C3 Subsystem Integration: advanced information technology, advanced memory technology.										
	64750F Intelligence Equipment: modeling and simulation, foreign threat assessment.										
	31355F Intelligence Data Handling: enhances DoD Intelligence Information Systems (DoDIIS).										
(U)	D. Acquisition Strategy										
	All major contracts within this Program Element were awarded after full and open competition.										
(U)	E. Schedule Profile										
					FY 1999			FY 2000	FY 2001		
				1	2	3	4	1	2	3	
	(U) Enhancing Intelligence Analysts Productivity Completed										
	(U) Machine Learning Prototype Complete										
	(U) Multimedia Information Access Complete										
	(U) Secure Information Delivery Initiated							X			
	* - Denotes completed event										
	X - Denotes planned event								X		
										X	

Project 643481

Page 12 of 18 Pages

Exhibit R-2A (PE 0603260F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
04 - Demonstration and Validation		0603260F Intelligence Advanced Development				
(U)	A. Project Cost Breakdown (\$ in Thousands)					
				FY 1999	FY 2000	FY 2001
(U)	Enhancing Intelligence Analysts Productivity			242		
(U)	Machine Learning Prototype			274	488	
(U)	Multimedia for Information Access			307	488	488
(U)	Intelligence Applications Browser Interfaces			295	337	488
(U)	Secure Information Delivery					311
(U)	Total			1,118	1,313	1,287
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)					
(U)	Performing Organizations:					
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget to Complete
	Product Development Organizations					
	GTE 96-C-0085	CPFF	May 96		200	TBD
	Booz Allen 96-C-0092	CPFF	Jun 96		58	TBD
	Kaman Science 97-C-0053	CPFF	May 96		0	TBD
	Synectics Corp 97-C-0073	CPFF	Jul 96		0	TBD
	Contractor TBD	TBD	TBD		0	TBD
	Support and Management Organizations					
	N/A					
	Test and Evaluation Organizations					
	N/A					
(U)	Government Furnished Property:					
	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Budget FY 1999	Budget FY 2000	Budget to Complete
	Item Description			Total Prior to FY 1999	Budget FY 2000	Total Program
Project 643481				Page 13 of 18 Pages		
				Exhibit R-3 (PE 0603260F)		

407

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
04 - Demonstration and Validation		0603260F Intelligence Advanced Development		643481	
(U) Government Furnished Property Continued:					
Contract					
Item	Method/Type	Award or	Delivery		
Description	or Funding	Obligation	Date		
Vehicle		Date			
Product Development Property					
N/A					
Support and Management Property					
N/A					
Test and Evaluation Property					
N/A					
Subtotals					
Subtotal Product Development					
Subtotal Support and Management					
Subtotal Test and Evaluation					
Total Project					

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE						DATE	PROJECT
04 - Demonstration and Validation		0603260F Intelligence Advanced Development						February 2000	643482
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Total Cost
643482	Science & Tech Intelligence Methodology	1,112	1,101	1,079	983	1,064	1,085	1,107	TBD
(U) A. Mission Description									
Demonstrates and validates intelligence methodologies and techniques for operational employment of simulation models in support of Air Intelligence Agency (AIA) requirements. The methods and techniques will help AIA improve their analysis of current and future foreign weapon systems, and prevent technological surprises with regard to the capabilities of these systems.									
(U)	<u>FY 1999 (\$ in Thousands)</u>								
(U)	\$397								
(U)	Completed Applied Deception Techniques for Manipulative Deception of Foreign Signal Collection Systems								
(U)	Continued Intelligence Analyst Associate (Build 2) for Automated Information Extraction								
(U)	Continued Missile System Reentry Vehicle Algorithm Enhancements for NAIC								
(U)	Total								
(U)	<u>FY 2000 (\$ in Thousands)</u>								
(U)	\$390								
(U)	Continue Intelligence Analyst Associate (Build 2) for Automated Information Extraction.								
(U)	Continue Missile System Reentry Vehicle Algorithm Enhancements for NAIC.								
(U)	Continue Radio Frequency Weapons Modeling Improvements (HEIMDAL2+) (includes Laser Weapons Modeling Code (LODUR). (Reference companion PE 64750, Intelligence Equipment.)								
(U)	Total								
(U)	<u>FY 2001 (\$ in Thousands)</u>								
(U)	\$390								
(U)	Complete Intelligence Analyst Associate (Build 2) for Automated Information Extraction.								
(U)	Continue Missile System Reentry Vehicle Algorithm Enhancements for NAIC.								
(U)	Continue Radio Frequency Weapons Modeling Improvements (HEIMDAL2+) (includes Laser Weapons Modeling Code (LODUR). (includes Laser Weapons Modeling Code (LODUR). (Reference companion PE 64750, Intelligence Equipment.)								
(U)	Total								
(U)	<u>B. Project Change Summary</u>								
(U)	Not Applicable								
Project 643482		Page 15 of 18 Pages						Exhibit R-2A (PE 0603260F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603260F Intelligence Advanced Development		February 2000 643482		
PE NUMBER AND TITLE									
0603260F Intelligence Advanced Development									
(U) C. Other Program Funding Summary (\$ in Thousands)									
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost
	Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	
(U) Related Activities:									
62720F C3I Exploratory Development: information exploitation(image/video/text), multi-sensor collaboration, global information base.									
63789F C3 Advanced Technology Development: correlation, fusion algorithms, visualization.									
63726F C3 Subsystem Integration: advanced information technology, advanced memory technology.									
64750F Intelligence Equipment: modeling and simulation, foreign threat assessment.									
31335F Intelligence Data Handling: enhances DoD Intelligence Information Systems (DoDIIS).									
(U) D. Acquisition Strategy									
All major contracts within this Program Element were awarded after full and open competition.									
(U) E. Schedule Profile									
	FY 1999		FY 2000		FY 2001				
	1	2	3	4	1	2	3	4	
(U) Applied Deception Techniques Completed				*					
(U) Radio Frequency Modeling Continuing (under this PE as well as PE 64750						X			
(U) Intel Analyst Associate (Build 2) Completed									X
* - Denotes completed event									
X - Denotes planned event									

Project 643482

Page 16 of 18 Pages

Exhibit R-2A (PE 0603260F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000				
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT		643482					
04 - Demonstration and Validation		0603260F Intelligence Advanced Development									
(U)	A. Project Cost Breakdown (\$ in Thousands)										
(U)	Applied Deception Techniques	FY 1999	FY 2000	FY 2001							
(U)	Intelligence Analysts Associate (Build 2)	397	390	390							
(U)	Missile System Reentry Vehicle Algorithm Enhancement	318	390	390							
(U)	Radio Frequency (RF) Modeling		321	299							
(U)	Total	1,112	1,101	1,079							
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)										
(U)	Performing Organizations:										
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
	Product Development Organizations										
	Calspan 96-C-0108	CPFF	Sep 96			87	397	390	390	Continuing	TBD
	E-Systems 96-C-0194	CPFF	Sep 96			19	397	0	0	Continuing	TBD
	Calspan 96-C-0108	CPFF	Jul 98			0	318	390	390	Continuing	TBD
	Contractor TBD	TBD	TBD			0	0	321	299	Continuing	TBD
	Support and Management Organizations										
	N/A										
	Test and Evaluation Organizations										
	N/A										
(U)	Government Furnished Property:										
	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
	Product Development Property										
	N/A										
Project 643482											
Page 17 of 18 Pages											
Exhibit R-3 (PE 0603260F)											

Project 643482

Page 17 of 18 Pages

Exhibit R-3 (PE 0603260F)

411

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation		0603260F Intelligence Advanced Development	643482		
(U) Government Furnished Property Continued:					
Support and Management Property					
N/A					
Test and Evaluation Property					
N/A					
Subtotals					
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete
		106	1,112	1,101	TBD
Subtotal Support and Management					
Subtotal Test and Evaluation					
Total Project		106	1,112	1,101	TBD
					TBD

Project 643482

Page 18 of 18 Pages

Exhibit R-3 (PE 0603260F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
04 - Demonstration and Validation		0603319F Airborne Laser Technology									644269
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644269	Airborne Laser	252,449	304,184	148,637	140,673	111,804	108,936	98,937	0	1,418,704	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	1	
<p>-- This funding profile reflects a Government Only estimate - contractor involvement precluded until after FY 2001 President's Budget is submitted to Congress</p> <p>-- The total cost reflects cost for Concept Design and Program Definition and Risk Reduction (PDRR) only and contains \$253.084M in funds prior to FY 1999</p> <p>-- Quantity of RDT&E Articles total includes purchase of a commercial 747-400F aircraft for PDRR phase. Purchase began in FY 1998 and was delivered in January, 2000</p>											
<p>(U) A. Mission Description</p> <p>The Airborne Laser (ABL) Program is an Acquisition Category 1D (ACAT 1D) program which will design, build and test a laser weapon system to acquire, track and kill Theater Ballistic Missiles (TBMs) in the boost phase. This weapon system integrates three major subsystems (Laser, Beam Control and Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I)) into a modified commercial Boeing 747-400F aircraft. It also includes ABL-specific ground support. The program awarded the ABL PDRR contract to the Boeing/TRW/Lockheed-Martin team in November 1996, to design, fabricate, integrate, and test the half-power ABL system. An Authority-to-Proceed (ATP-1) decision point was successfully attained in FY 1998. The PDRR phase culminates in lethality (missile shoot-down) demonstrations against boosting TBM representative targets in FY 2005. The PDRR phase will integrate and test key technologies. The EMD program is currently scheduled to begin in FY 2005.</p>											
(U)	FY 1999 (\$ in Thousands)										
(U)	\$192,319	Continued Boeing/TRW/Lockheed-Martin PDRR contract effort for design, fabrication, integration, and testing the ABL weapon system, including beginning design of the Systems Integration Lab (SIL) at Birk facility at Edwards AFB, CA									
(U)	\$34,669	PDRR commercial aircraft payments									
(U)	\$5,470	Continued support for special studies, simulations and analyses, technical support, risk management, and an independent review team specializing in lasers, aircraft, and aircraft integration									
(U)	\$19,991	Continued support for atmospheric characterization tests (North Oscura Peak (NOP), star scintillometer), labor, training, Integrated Product Team (IPT) participation, and other government agencies.									
(U)	\$252,449	Total									

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
04 - Demonstration and Validation	0603319F Airborne Laser Technology	February 2000	644269
(U) A. Mission Description Continued			
(U) FY 2000 (\$ in Thousands)			
(U) \$202,850	Continue Boeing/TRW/Lockheed-Martin PDRR contract effort for design, fabrication, integration, and testing the ABL weapon system, including design of SIL at Birk facility at Edwards AFB, CA		
(U) \$83,778	Final PDRR commercial aircraft payment (aircraft delivery)		
(U) \$4,327	Continue support for special studies, simulations and analyses, technical support, risk management, and an independent review team specializing in lasers, aircraft, and aircraft integration		
(U) \$13,229	Continue support for labor, training, IPT participation, and other government agencies; conducts overseas star scintillometer campaign		
(U) \$304,184	Total		
	Note: ABL has gone through a restructure which was not completed until after the FY 2000 PB submission. This accounts for the variability of costs since the FY 2000 PB.		
(U) FY 2001 (\$ in Thousands)			
(U) \$138,000	Continue Boeing/TRW/Lockheed-Martin PDRR contract effort for design, fabrication, integration, and testing the ABL weapon system, including design of SIL at Birk facility at Edwards AFB, CA or to Wichita facility at Wichita, KS		
(U) \$3,874	Continue support for special studies, simulations and analyses, technical support, risk management, and an independent review team specializing in lasers, aircraft, and aircraft integration		
(U) \$6,763	Continue support for labor, training, IPT participation, and other government agencies		
(U) \$148,637	Total		
(U) B. Budget Activity Justification			
	This program is in budget activity 4 (BAC-4) - Demonstration and Validation; ABL is a major defense acquisition program which was authorized to enter PDRR at the Milestone I, November 1996.		
(U) C. Program Change Summary (\$ in Thousands)			
		FY 1999	FY 2000
(U) Previous President's Budget (FY 2000 PBR)		265,679	308,634
(U) Appropriated Value		267,219	308,634
(U) Adjustments to Appropriated Value		-785	-62
a. Congressional/General Reductions		-8,342	
b. Small Business Innovative Research			-2,465
c. Omnibus or Other Above Threshold Reprogram			
			Total Cost
			1,630,738
Project 644269		Exhibit R-2 (PE 0603319F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603319F Airborne Laser Technology	644269	
(U) <u>C. Program Change Summary (\$ in Thousands) Continued</u>			
	FY 1999	FY 2000	FY 2001
d. Below Threshold Reprogram	-3,476		
e. Rescissions	-2,167	-1,923	
f. Other			
(U) Adjustments to Budget Years Since FY 2000 PBR			
(U) Current Budget Submit/FY 2001 PBR	252,449	304,184	-92,420
Note: FY 1999 \$3.7M BTR into ABL for mandated overseas star scintillometer tests not reflected in table above.			148,637
			1,418,704
(U) <u>Significant Program Changes:</u>			
Significant Program Changes: The Department of Defense restructured the program to delay lethal demonstration of a boosting theater ballistic missile (TBM) from FY 2003 to FY 2005 and Initial Operational Capability (IOC)/Full Operational Capability (FOC) are TBD.			
(U) <u>D. Other Program Funding Summary (\$ in Thousands)</u>			
	FY 1999	FY 2000	FY 2001
	Actual	Estimate	Estimate
(U) AF RDT&E	0	0	0
(U) PE 0604350F Airborne	0	0	0
Laser EMD	0	0	0
(U) Quantity*	0	0	0
(U) Other APPN	0	0	0
Note 1 - PE 0603605F, Advanced Weapons - supports ABL by developing technologies for potential performance enhancements above current requirements identified in ABL Operational Requirements Document (ORD)			
Note 2 - PE 0207150, ABL Procurement (including MILCON) has moved outside the FYDP. It is planned that this PE will procure 5 new ABL weapon systems and refurbish the 2 RDT&E test articles to production-representative configurations.			
* Quantity refers to EMD RDT&E test article only (PE 0604350F). ABL purchased an RDT&E test article (the PDRR a/c) beginning in FY 1998 (PE 0603319F).			
Project 644269	Page 3 of 6 Pages	Exhibit R-2 (PE 0603319F)	

[illegible]

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000	PROJECT	
BUDGET ACTIVITY										PE NUMBER AND TITLE			
04 - Demonstration and Validation										0603319F Airborne Laser Technology			644269
(U)	A. Project Cost Breakdown (\$ in Thousands)												
(U)	Major Contracts (PDRR contract and Concept Design)										FY 1999	FY 2000	FY 2001
(U)	Support Contracts (Technical Support, Analysis)										226,988	286,628	138,000
(U)	Test/Other Government/Misc Support/Salaries/IPTs										5,470	4,327	3,874
(U)	Total										19,991	13,229	6,763
(U)											252,449	304,184	148,637
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)												
(U)	Performing Organizations:												
	Contractor or Government	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
	Product Development Organizations												
	Boeing Defense & Space Group Seattle, WA	CPAF	12 Nov 96	TBD	1,249,697	170,081	226,988	286,628	138,000	428,000	1,249,697		
	Concept Design Contract (Rockwell International, CA)	CPFF	9 May 94	22,071	22,071	22,071	0	0	0	0	22,071		
	Concept Design Contract (Boeing Defense & Space Group, WA)	CPFF	9 May 94	21,689	21,689	21,689	0	0	0	0	21,689		
	Note - The revised program cannot be discussed with the contractor until after the FY 2001 PB is submitted to Congress. Therefore, we have no performing activity estimate at completion (EAC) at this time.												
	Support and Management Organizations												
	Technical Support Contracts	Various	Varies	N/A	N/A	15,465	5,470	4,327	3,874	12,000	41,136		
	Government In-House and Other External Support	Various	Varies	N/A	N/A	22,699	18,491	10,259	5,089	12,576	69,114		
	Test and Evaluation Organizations												
	Air Force Flight Test Center (AFFTC)	MIPR	Varies	N/A	N/A	1,079	1,500	2,970	1,674	7,774	14,997		
Project 644269										Page 5 of 6 Pages			Exhibit R-3 (PE 0603319F)

417

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603319F Airborne Laser Technology								644269	
(U) Government Furnished Property:											
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
Product Development Property											
<p>The government is providing miscellaneous support equipment during the test phase of the PDRR program. In addition, the government is also providing hardware items to facilitate Infrared Search and Track (IRST) tests. The costs of these two categories of GFP fall below the \$1M reporting threshold. In addition, targets for the PDRR test program will be provided as GFP and will be listed separately when they become part of the contract.</p>											
<p>-- AFFTC is the sole representative to the customer for Test and Evaluation. AFFTC receives funding from the program office and controls the distribution of these funds within AFFTC, the White Sands Missile Range (WSMR), and the Western Test Range (WTR).</p>											
Support and Management Property											
Test and Evaluation Property											
Subtotals											
Subtotal Product Development				Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
				213,841	226,988	286,628	138,000	428,000	1,293,457		
Subtotal Support and Management				38,164	23,961	14,586	8,963	24,576	110,250		
Subtotal Test and Evaluation				1,079	1,500	2,970	1,674	7,774	14,997		
Total Project				253,084	252,449	304,184	148,637	460,350	1,418,704		

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
04 - Demonstration and Validation		0603430F Advanced (EHF) MILSATCOM (Space)									644050
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644050	Advanced MILSATCOM	54,623	95,529	246,396	519,832	470,373	340,566	243,105	292,883	2,383,788	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	2	2	
<p>(U) A. Mission Description Develop and acquire Advanced Extremely High Frequency (EHF) Military Satellite Communications (MILSATCOM) satellites and cryptography with necessary modifications to the mission control segment for survivable, jam-resistant, worldwide, secure communications for the strategic and tactical warfighter. Advanced EHF (AEHF) satellites will replenish the existing EHF system (Milstar) with additional capability and decreased launch costs. The program is utilizing as much commercial technology as possible and will ensure technology development sufficient for a medium launch vehicle-class satellite. The Advanced EHF capability will be available for first launch in 2006. Activities funded under this program element implement the Secretary of Defense's 1993 MILSATCOM Bottom Up Review decision to field a lower cost, advanced MILSATCOM satellite as a replenishment to Milstar. The DoD Space Architect in 1996 and OSD-led MILSATCOM Transition Team in 1997 reviewed the options for future EHF service and concluded this program is the best solution for those requirements. The Advanced EHF program implements the architecture defined by the DoD Space Architect and directed by the Joint Space Management Board and will address requirements in the MILSATCOM Capstone Requirements Document (24 April 1998) and the Operational Requirements Document approved by the Joint Requirements Oversight Council in April 1999.</p>											
(U)	FY 1999 (\$ in Thousands)										
(U)	\$1,761										
(U)	\$52,324										
(U)	\$538										
(U)	\$54,623										
(U)	Total										
(U)	FY 2000 (\$ in Thousands)										
(U)	\$1,700										
(U)	\$29,391										
(U)	\$34,000										
(U)	\$22,400										
(U)	\$4,822										
(U)	\$3,216										
(U)	\$95,529										
(U)	Total										
Project 644050											Exhibit R-2 (PE 0603430F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603430F Advanced (EHF MILSATCOM (Space))	644050		
(U) A. Mission Description Continued				
(U) FY 2001 (\$ in Thousands)	Complete System Definition			
(U) \$8,000	Begin Engineering & Manufacturing Development (EMD) of the first AEHF satellite			
(U) \$199,898	Continued Satellite Cryptographic Development			
(U) \$18,300	Program Office Support - Continue AEHF Support and Transition Advanced EHF MILSATCOM Joint Program Office Support from Milstar PE			
(U) \$16,888	JTEO Support			
(U) \$3,310	Total			
(U) \$246,396				
(U) B. Budget Activity Justification				
	This program is in Budget Activity 4, Research Category Demonstration and Validation, since it funds Advanced EHF technology validation and modeling.			
(U) C. Program Change Summary (\$ in Thousands)				
(U) Previous President's Budget (FY 2000 PBR)		FY 1999	FY 2000	FY 2001
(U) Appropriated Value		54,150	97,066	248,587
(U) Adjustments to Appropriated Value		54,413	97,066	
a. Congressional/General Reductions		-263	-7	
b. Small Business Innovative Research		-1,057		
c. Omnibus or Other Above Threshold Reprogram			-774	
d. Below Threshold Reprogram		1,836		
e. Rescissions		-306	-756	
f. Other				
(U) Adjustments to Budget Years Since FY 2000 PBR				-2,191
(U) Current Budget Submit/FY 2001 PBR		54,623	95,529	246,396
(U) Significant Program Changes:				2,383,788
	\$1,836K FY99 Below Threshold Reprogramming action funded a Cost As an Independent Variable (CAIV) analysis to prioritize program requirements within approved funding levels.			
	-\$2,191K FY01 adjustment due to inflation rate changes.			
	FY04 and FY05 adjustments realigned funds from the Missile Procurement appropriation to the RDT&E appropriation to more appropriately align funding with work being performed.			
Project 644050		Page 2 of 6 Pages		
		Exhibit R-2 (PE 0603430F)		

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE					DATE		
04 - Demonstration and Validation		0603430F Advanced (EHF MILSATCOM (Space)					February 2000		
							PROJECT		
							644050		
(U)	D. Other Program Funding Summary (\$ in Thousands)								
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Total Cost
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete
(U)	Related Missile Proc:								
(U)	PE 0303604, Advanced EHF	0	0	0	20,000	376,135	280,753	300,100	630,421
(U)	MILSATCOM Procurement								1,607,409
(U)	PE 33600F, AF Wideband	0	0	4,852	5,411	5,503	8,115	2,209	0
(U)	3080 (CCSC)								26,090
(U)	Related RDT&E:								
(U)	PE 63854F, BPAC 836780,	0	0	11,500	13,300	24,400	46,600	25,900	0
(U)	AF Wideband 3600 (CCSC)								121,700
(U)	PE 0604479F, Milstar								
(U)	LDR/MDR Satellite								
(U)	Communications								
(U)	PE 0604577N, EHF Satellite								
(U)	Communications								
(U)	PE 0603432F, Polar								
(U)	MILSATCOM								
(U)	PE 0303601F, MILSATCOM								
(U)	Terminals								
(U)	E. Acquisition Strategy								
	The Advanced MILSATCOM strategy is a competitive acquisition between two contractors for System Definition. One contractor will be selected to perform Engineering and Manufacturing Development and fabrication of five satellites. Advanced MILSATCOM will incorporate improvements from Milstar and commercial SATCOM practices into the next generation EHF military communication satellite system.								
(U)	F. Schedule Profile								
		FY 1999	FY 2000	FY 2001					

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE						
	0603430F Advanced (EHF MILSATCOM (Space)) PROJECT 644050						
(U) F. Schedule Profile Continued							
	FY 1999				FY 2000		FY 2001
	1	2	3	4	1	2	3
		*					
(U) Milestone I DAB							
(U) Award System Definition Contract					X		
(U) Processing Engineering Model Completion						X	
(U) Milestone II/III - DAB							X
(U) Award EMD Contract							
(U) First Launch - (FY06)							
* = Completed Event							
X = Planned Event							
Corrects Milestone II error in previous version							

Project 644050
Page 4 of 6 Pages
Exhibit R-2 (PE 0603430F)

422

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000				
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT					
04 - Demonstration and Validation		0603430F Advanced (EHF MILSATCOM (Space))				644050					
(U)	A. Project Cost Breakdown (\$ in Thousands)										
(U)	MILSATCOM Technology Validation Program	FY 1999	FY 2000	FY 2001		FY 2001	0				
(U)	Processing Subsystem Engineering Model	1,761	1,700				0				
(U)	Program Office Support	52,324	29,391				16,888				
(U)	System Definition	538	4,822				8,000				
(U)	Cryptographic Development	0	34,000				18,300				
(U)	Satellite EMD	0	22,400				199,898				
(U)	Joint Terminal Engineering Office (JTEO)	0	0				3,310				
(U)	Total	54,623	95,529				246,396				
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)										
(U)	Performing Organizations:										
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Product Development Organizations											
	NSA	MIPR	Dec 99	55,200	55,200	0	0	22,400	18,300	0	40,700
	JTEO	PR	Continuing	95,644	95,644	2,000	0	3,216	3,310	74,778	83,304
	MIT/LL	MIPR	Feb 95	11,110	11,110	1,527	1,761	1,700	0	0	4,988
	Hughes	CPFF	May 97	66,851	66,851	25,392	26,771	15,012	0	0	67,175
	TRW	CPFF	May 97	60,862	60,862	22,151	25,553	14,379	0	0	62,083
	Various	Various	95-01	N/A	N/A	66,659	0	0	0	0	66,659
	Lockheed Martin	FFP	Oct FY00	21,000	21,000	0	0	17,000	4,000	0	21,000
	Hughes	FFP	Oct FY00	21,000	21,000	0	0	17,000	4,000	0	21,000
	EMD Contractor (TBD)	TBD	Apr FY01	TBD	TBD	0	0	0	199,898	1,710,145	1,910,043
Support and Management Organizations											
	Various	Various	2Q95			2,752	538	4,822	16,888	81,836	106,836
Test and Evaluation Organizations											
Project 644050											
Page 5 of 6 Pages											
Exhibit R-3 (PE 0603430F)											

423

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT	
04 - Demonstration and Validation		0603430F Advanced (EHF MILSATCOM (Space)			644050	
(U) Government Furnished Property:						
Contract						
Method/Type		Award or				
Item	or Funding	Obligation	Delivery			
Description	Vehicle	Date	Date			
Product Development Property						
None						
Support and Management Property						
None						
Test and Evaluation Property						
None						
Subtotals						
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete	Total Program
Subtotal Support and Management		117,729	54,085	90,707	229,508	2,276,952
Subtotal Test and Evaluation		2,752	538	4,822	16,888	106,836
Total Project		120,481	54,623	95,529	246,396	2,383,788

Project 644050

Page 6 of 6 Pages

Exhibit R-3 (PE 0603430F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603432F Polar MILSATCOM (Space)								644052	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644052	Polar Satellite Communications	36,291	39,049	26,068	12,923	8,631	3,387	3,379	0	277,039	
	Quantity of RDT&E Articles	0	0	0	0	1	1	0	0	3	
(U)	A. Mission Description										
	The Polar MILSATCOM program will provide protected communications services to U.S. forces operating in the northern polar region. It is the cheaper 'adjunct' to the Milstar program which followed the 1992 Milstar program restructure which deleted two polar orbiting Milstar satellites and directed the Air Force to find a more cost-effective solution. In Oct 94, the DoD identified an immediate need for protected polar communications, and in Jul 95, the Joint Requirements Oversight Council (JROC) validated the Polar MILSATCOM ORD which contained the interim requirements. In July 95, the Defense Acquisition Executive reviewed Polar MILSATCOM program and approved execution of the Interim Polar subset to expeditiously place a modified Extremely High Frequency (EHF) payload designed for the Navy's UHF Follow On (UFO) system onto a classified host satellite to provide limited requirements satisfaction while pursuing a long term solution. In Aug 96, the Joint Space Management Board (JSMB) approved the DoD Space Architect's option for Polar MILSATCOM to sustain 24 hours-per-day EHF Polar capability. The first of three interim (hosted) packages was launched in Nov 97, the last two will launch in FY03 and FY04.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$36,291	Continued parts buy and payload/integration development with host vehicle for Interim Polar packages 2 and 3. (Through classified host contract)									
(U)	\$36,291	Total									
(U)	FY 2000 (\$ in Thousands)										
(U)	\$39,049	Continue parts buy and payload/integration development with host vehicle for Interim Polar packages 2 and 3. (Through classified host contract)									
(U)	\$39,049	Total									
(U)	FY 2001 (\$ in Thousands)										
(U)	\$26,068	Continue payload development and integration development with host vehicle for Interim Polar packages 2 and 3. (Through the classified host contract)									
(U)	\$26,068	Total									
Project 644052		Page 1 of 5 Pages								Exhibit R-2 (PE 0603432F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603432F Polar MILSATCOM (Space)	644052	
(U) B. Budget Activity Justification	The PolarMILSATCOM program is in Budget Activity 4, Demonstration and Validation, based on a 30 Mar 95 USD(A&T) memorandum to pursue the interim hosted solution (Interim Polar).		
(U) C. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget (FY 2000 PBR)	FY 1999	FY 2000	FY 2001
(U) Appropriated Value	41,367	39,678	26,300
(U) Adjustments to Appropriated Value	41,508	39,678	
a. Congressional/General Reductions	-141	-1	
b. Small Business Innovative Research			
c. Omnibus or Other Above Threshold Reprogram	-4,873	-319	
d. Below Threshold Reprogram	-203	-309	
e. Rescissions			
f. Other			
(U) Adjustments to Budget Years Since FY 2000 PBR			-232
(U) Current Budget Submit/FY 2001 PBR	36,291	39,049	26,068
(U) Significant Program Changes:			
(U) FY 99 and FY 01 adjustments made to fund higher priority Air Force efforts. The total program increased due to an error on the FY00 PB request.			
(U) D. Other Program Funding Summary (\$ in Thousands)			
	FY 1999	FY 2000	FY 2001
Actual	Estimate	Estimate	Estimate
(U) PE 0302109N Navy SATCOM Sub/Ship Terminals.			
(U) E. Acquisition Strategy			
The Air Force provides funds to the classified host program office to modify the host satellite system contract to include the Polar EHF package. The host program office has total acquisition responsibility for interim Polar.			
Project 644052		Exhibit R-2 (PE 0603432F)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					
BUDGET ACTIVITY	PE NUMBER AND TITLE				DATE
	0603432F Polar MILSATCOM (Space)				February 2000
					PROJECT 644052
(U) F. Schedule Profile					
(U) Hosted Interim Payload #1 Launched (1QFY98)	1	FY 1999 2	3	4	FY 2000 2
(U) Preliminary Design Review			*		
(U) Critical Design Review					X
(U) (Payloads 2 and 3 to launch in FYs 03 & 04)					

Project 644052
Page 3 of 5 Pages
Exhibit R-2 (PE 0603432F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000	PROJECT	
BUDGET ACTIVITY										PE NUMBER AND TITLE			
04 - Demonstration and Validation										0603432F Polar MILSATCOM (Space)			
										FY 1999	FY 2000	FY 2001	
(U)	A. Project Cost Breakdown (\$ in Thousands)												
(U)	Packages 2 & 3 Planning, Design, and Parts Buy										0	0	0
(U)	Packages 2 & 3 Payload/Integration Development										36,291	39,049	26,068
(U)	Total										36,291	39,049	26,068
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)												
(U)	Performing Organizations:												
	Contractor or	Contract		Performing	Project		Budget	Budget	Budget	Budget to	Total		
	Government	Method/Type	Award or	Activity	Office	Total Prior	FY 1999	FY 2000	FY 2001	Complete	Program		
	Performing	or Funding	Obligation	EAC	EAC	to FY 1999							
	Activity	Vehicle	Date										
	Product Development Organizations												
	Classified		June 95	Continuing	Continuing	147,311	36,291	39,049	26,068	28,320	277,039		
	Support and Management Organizations												
	N/A												
	Test and Evaluation Organizations												
	N/A												
(U)	Government Furnished Property:												
	Contract												
	Method/Type	Award or		Delivery			Budget	Budget	Budget	Budget to	Total		
	or Funding	Obligation		Date		Total Prior	FY 1999	FY 2000	FY 2001	Complete	Program		
	Vehicle	Date				to FY 1999							
	Product Development Property												
	N/A												
	Support and Management Property												
	N/A												
	Test and Evaluation Property												
	N/A												

Project 644052

Page 4 of 5 Pages

Exhibit R-3 (PE 0603432F)

428

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
04 - Demonstration and Validation		0603432F Polar MILSATCOM (Space)		644052	
Subtotals	Total Prior	Budget	Budget	Budget	Total
Subtotal Product Development	to FY 1999	FY 1999	FY 2000	FY 2001	Complete
Subtotal Support and Management	147,311	36,291	39,049	26,068	28,320
Subtotal Test and Evaluation					
Total Project	147,311	36,291	39,049	26,068	28,320
					277,039

Project 644052

Page 5 of 5 Pages

Exhibit R-3 (PE 0603432F)

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)								644056	
		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644056	National Polar-orbiting Operational Env. Sat. Syst.	62,068	59,180	76,654	156,503	236,471	306,454	325,429	695,698	2,001,757	
	Quantity of RDT&E Articles	0	0	0	1	0	0	0	1	2	
<p>(U) A. Mission Description</p> <p>Presidential Decision Directive/NSTC-2 (May 1994) directs the Departments of Defense (DoD) and Commerce (DoC) and the National Aeronautics and Space Administration to establish a converged national polar-orbiting weather satellite program. The converged program, the National Polar-orbiting Operational Environmental Satellite System (NPOESS), will combine the follow-on to DoD's Defense Meteorological Satellite Program (DMSP) and the DoC's Polar-orbiting Operational Environmental Satellite (POES) program. A tri-agency Integrated Program Office (IPO) was established on 1 Oct 94 to manage the acquisition and operations of the converged system. NPOESS will provide operational military commanders and civilian leaders timely, quality weather and environmental information to effectively employ weapon systems and protect national resources. The converged program will be the nation's primary source of global weather and environmental data for operational military and civil use. It will provide visible and infrared cloud cover imagery and other atmospheric, oceanographic, terrestrial, and space environmental information. At least two NPOESS satellites will be required in sun synchronous 450 nm polar-orbit at all times (sun synchronous means the satellites cross the equator at the same local sun time on each of their 14 orbits/day). The European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) will provide a third satellite which, with the NPOESS satellites, will comprise the Joint Polar System of weather satellites. NPOESS successfully completed Milestone I on 17 March 1997.</p> <p>(U) <u>FY 1999 (\$ in Thousands)</u></p> <p>(U) \$647 Continued program office support for Program Definition and Risk Reduction efforts (PDRR).</p> <p>(U) \$3,804 Continued government-led risk reduction and technology development efforts.</p> <p>(U) \$4,500 Continued competitive system architecture studies.</p> <p>(U) \$53,117 Continued critical sensor/algorithm development efforts and design/fabrication for risk reduction missions.</p> <p>(U) \$62,068 Total</p>											

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation	0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)	644056

(U)	<u>A. Mission Description Continued</u>
(U)	<u>FY 2000 (\$ in Thousands)</u>
(U)	\$648 Continue program office support for PDRR efforts.
(U)	\$900 Completed government-led risk reduction and technology development efforts.
(U)	\$4,986 Continue system architecture studies and ground system risk reduction to include competitive contracts between TRW and Lockheed Martin to definitize the NPOESS space and ground segment architectures.
(U)	\$52,646 Continue critical VIIRS, CMIS, CrIS, OMPS, and GPSOS sensor and associated algorithm development efforts and sensor design and fabrication for risk reduction missions.
(U)	\$59,180 Total
(U)	<u>FY 2001 (\$ in Thousands)</u>
(U)	\$617 Continue program office support for PDRR efforts.
(U)	\$12,850 Continue system definition contracts and ground system risk reduction to include competitive contracts between TRW and Lockheed Martin to definitize the NPOESS space and ground segment architectures.
(U)	\$63,187 Continue critical VIIRS, CMIS, CrIS, OMPS, and GPSOS sensor and associated algorithm development efforts and sensor design and fabrication for risk reduction missions.
(U)	\$76,654 Total
	Acronyms:
	VIIRS - Visible/Infrared Imager/Sounder Suite
	CMIS - Conical Microwave Imager/Sounder
	CrIS - Cross Track Infrared Sounder
	OMPS - Ozone Mapper and Profiler Suite
	GPSOS - Global Positioning System Occultation Sensor
(U)	<u>B. Budget Activity Justification</u>
	This PE is in Budget Activity 4 (Demonstration and Validation) because it currently supports sensor and satellite bus development.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)	644056		
(U) <u>C. Program Change Summary (\$ in Thousands)</u>		FY 1999	FY 2000	FY 2001
(U) Previous President's Budget (FY 2000 PBR)		64,438	80,137	113,234
(U) Appropriated Value		64,732	60,137	
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions		-294	-8	-302
b. Small Business Innovative Research		-2,023	-480	-2,023
c. Omnibus or Other Above Threshold Reprogram				-480
d. Below Threshold Reprogram				
e. Rescissions		-347	-469	-816
f. Other				
(U) Adjustments to Budget Years Since FY 2000 PBR				-36,580
(U) Current Budget Submit/FY 2001 PBR		62,068	59,180	76,654
(U) <u>Significant Program Changes:</u>				2,001,757
Funding: The FY01 reductions resulted from restructuring the program due to the FY00 congressional marks. FY01 funding for DMSP solid state recorders, which was previously included in the Multi-spectral Operational Linescan System (MOLS) risk reduction effort, was transferred to the DMSP program.				
Schedule: The sensor, ground system, and first satellite acquisition schedule slipped due to FY00 congressional marks. The first satellite availability date has slipped three months from July 08 to Sept 08.				
Technical: In FY00, combined system architecture studies with system definition and ground system risk reduction contracts. No additional funding required to complete this previously scheduled effort. Prior to FY00, NPOESS planned a Multi-spectral Operational Linescan System (MOLS) modification to DMSP's primary sensor to reduce risk to the NPOESS VIIRS sensor development, the VIIRS user segments, and provide a required enhancement to DMSP's primary operational sensor. Congressional marks in FY00 made this effort unaffordable and thus forced the termination of MOLS. To make-up for the loss of MOLS, development of the NPOESS's VIIRS data processing software was accelerated to permit real-time user exploitation of VIIRS data from the NPOESS Preparatory Program (NPP) mission. Therefore, the risk reduction activities and operational user enhancement that were to be provided by DMSP's MOLS will now be provided by NPP.				
Project 644056		Page 3 of 7 Pages		Exhibit R-2 (PE 0603434F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE		February 2000			
04 - Demonstration and Validation		0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)				PROJECT 644056			
(U) D. Other Program Funding Summary (\$ in Thousands)									
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Total Cost
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete
(U) Related RDT&E: DMSP PE 035160F		19,983	21,207	25,372	14,934	11,882	11,131	11,396	22,057
(U) Related RDT&E: DMSP PE 0305160N for Navy unique efforts									955,279
(U) Related NOAA PAC Funding: Polar Convergence*									
* National Oceanic and Atmospheric Administration Procurement, Acquisition, and Construction (NOAA PAC) appropriation. The Air Force (DoD) and NOAA (DoC) fund NPOESS 50/50.									
(U) E. Acquisition Strategy									
		<p>The guiding tenets for NPOESS acquisition include accomplishing substantial risk reduction with a focus on payload development, enhancing data utility to users, deferring major system decisions as long as reasonable, and protecting maximum flexibility to ensure the best overall system design. The program pursues a significant investment in the development and on-orbit testing of selected payload sensors while deferring individual sensor selections among competing international, NASA, military, and industry alternatives to assess and determine the optimum technical performance potential of each candidate sensor. NPOESS is currently pursuing two missions to reduce sensor development and data user segment risk. The Windsat/Coriolis mission will prove technologies to be used for the NPOESS Conical Microwave Imager/Sounder (CMIS) sensor. The NPOESS Preparatory Project will fly and test-out three of NPOESS's most complex sensors: the Visible/Infrared Imager/Radiometer Suite (VIIRS), the Cross Track Infrared Sounder (CrIS), and the Advanced Technology Microwave Sounder (ATMS). Overall system prime contractor selection is being deferred to minimize system level preliminary costs, allow sensor complement maturation, and delay the commitment to full system acquisition until approximately seven years before the first satellite need date. In FY00, eliminated the separate contract for system architecture studies due to contractor mergers. This effort will now be accomplished on the same contract as the ground system risk reduction efforts.</p> <p>The NPOESS Executive Committee (EXCOM) has restructured the program twice since the Milestone I decision. The combined result of the EXCOM's decisions has delayed the availability of the first NPOESS satellites from January 2007 to July 2008. Congressional reductions to the FY00 budget for NPOESS forced another three month delay to the availability of the first NPOESS satellite. The first satellite should be available in time to fulfill the requirement to back-up the last of the DMSP or POES launches, whichever comes first. The IPO downselected two sensor development contracts during FY99. Ball Aerospace was awarded the production contract for the Ozone Mapping and Profiler Suite (OMPS) and ITT Aerospace was downselected to build the Cross Track Infrared Sounder (CrIS) sensor. Also, in Dec 99 the IPO</p>							

Project 644056

Page 4 of 7 Pages

Exhibit R-2 (PE 0603434F)

434

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000																																																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																																			
04 - Demonstration and Validation	0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)	644056																																																			
<p>(U) <u>E. Acquisition Strategy Continued</u> awarded competitive Program Definition and Risk Reduction contracts to TRW and Lockheed Martin.</p>																																																					
<p>(U) <u>E. Schedule Profile</u></p> <table border="1"> <thead> <tr> <th></th> <th colspan="2">FY 1999</th> <th colspan="2">FY 2000</th> <th colspan="2">FY 2001</th> </tr> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>Program Rebaselined</td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Competitive Sensor Development Contracts Downselected</td> <td></td> <td></td> <td>*</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Award Competitive Program Definition & Risk Reduction contracts</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Milestone II/III - 2QFY02</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>* = Completed Event X = Planned Event</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						FY 1999		FY 2000		FY 2001			1	2	3	4	1	2	Program Rebaselined	*						Competitive Sensor Development Contracts Downselected			*			X	Award Competitive Program Definition & Risk Reduction contracts							Milestone II/III - 2QFY02							* = Completed Event X = Planned Event						
	FY 1999		FY 2000		FY 2001																																																
	1	2	3	4	1	2																																															
Program Rebaselined	*																																																				
Competitive Sensor Development Contracts Downselected			*			X																																															
Award Competitive Program Definition & Risk Reduction contracts																																																					
Milestone II/III - 2QFY02																																																					
* = Completed Event X = Planned Event																																																					

Project 644056

Page 5 of 7 Pages

435

UNCLASSIFIED

Exhibit R-2 (PE 0603434F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE		February 2000			
04 - Demonstration and Validation		0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)				PROJECT 644056			
(U)	A. Project Cost Breakdown (\$ in Thousands)								
				FY 1999	FY 2000			FY 2001	
(U)	Program Office Support for PDRR efforts			647	648			617	
(U)	System Architecture Studies/Definition/Ground System Risk Reduction			4,500	4,986			12,850	
(U)	Government Led Risk Reduction/ Technology efforts			3,804	900			0	
(U)	Sensor/Algorithm Development and Design/Fabrication for Risk Reduction Missions/Program Support			53,117	52,646			63,187	
(U)	Total			62,068	59,180			76,654	
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)								
(U)	Performing Organizations:								
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001
									Budget to Complete
									Total Program
	Product Development Organizations								
	Syst. Arch. Studies	C/CPFF	Sep 96	17,320	17,320	12,820	4,500		0
	TRW (PDRR)	C/FPF	Dec 99	10,609	10,609			2,493	1,685
	Lockheed Martin (PDRR)	C/FPF	Dec 99	10,609	10,609			2,493	1,685
	Lockheed Martin	C/CPAF	Dec 94	4,597	4,597	4,489			
	Raytheon (VIIRS & CrIS)	C/CPFF	Jul 97	26,181	26,181	8,407	10,945	6,829	26,181
	Ball Aerospace (CMIS & OMPS)	C/CPFF	Jul 97	24,961	24,961	3,498	10,068	6,179	24,961
	Ball Aerospace (OMPS)	C/CPAF	May 99	30,627	30,627			3,848	18,223
	ITT Aerospace (VIIRS & CrIS)	C/CPFF	Jul 97	26,325	26,325	7,407	12,089	6,829	26,325
	Hughes Space and Communications (CMIS)	C/CPFF	Jul 97	23,002	23,002	2,074	9,533	6,179	23,002
	Orbital Sciences (OMPS)	C/CPFF	Jul 97	2,425	2,425	1,425	1,000		2,425
Project 644056									
Page 6 of 7 Pages									
Exhibit R-3 (PE 0603434F)									

436

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 2000	PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE			0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)			644056
04 - Demonstration and Validation								
(U) Performing Organizations Continued:								
Product Development Organizations								
SAAB Ericsson (GPSOS)	C/CPFF	Jul 97	2,786	2,786	400	488	1,380	2,786
SAAB Ericsson (GPSOS)	SS/FFP	Aug 99	3,496	3,496		8,130	5,686	3,496
ITT Areospace (CrIS)	C/CPAF	Aug 99	27,159	27,159		9,454	13,343	27,159
Other follow-on contract	MISC	Various	1,714,215	1,714,215	8,735	9,454	1,658,167	1,714,323
Government Led Studies	Gov. Orgs.	Various	51,007	51,007	4,151	5,610	4,140	14,762
Support and Management Organizations								
Integrated Program Office	Various	Various	26,438	26,438	647	648	617	11,062
(IPO) Support								26,438
Test and Evaluation Organizations								
TBD								
(U) Government Furnished Property:								
Contract								
Item	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Total Program
Product Development Property								
NOT APPLICABLE								
Support and Management Property								
NOT APPLICABLE								
Test and Evaluation Property								
NOT APPLICABLE								
Subtotals								
Subtotal Product Development				Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Total Program
Subtotal Support and Management				69,836	61,421	58,532	76,037	1,975,319
Subtotal Test and Evaluation				13,464	647	648	617	26,438
Total Project				83,300	62,068	59,180	76,654	2,001,757
Project 644056								Exhibit R-3 (PE 0603434F)

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603438F Space Control Technology								642611	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
642611	Technology Insertion Planning and Analysis	7,212	12,621	9,728	9,717	9,699	9,679	9,658	Continuing	TBD	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	
Note: Congressional add resulted in an Air Force new start in FY99.											
(U) A. Mission Description This program supports a range of activities including technology planning, development, demonstrations and prototyping, as well as modeling, simulations and exercises to support development of tactics and procedures in the Space Control mission area. The types of Space Control activities accomplished are surveillance, protection, prevention, and negation. Surveillance is the monitoring, detecting, identifying, tracking, assessing, verifying, categorizing, and characterizing, objects and events in space for use in the Space Control mission area. Protection includes defensive activities to protect U.S. and friendly space-systems assets, resources, and operations from enemy attempts to negate or interfere. Prevention limits or eliminates an adversary's ability to use U.S. space systems and services for purposes hostile to U.S. national security interests. Negation activities disrupt, deny, degrade or destroy an adversary's space systems, or the information they provide, which may be used for purposes hostile to U.S. national security interests. Consistent with DoD policy, the negation efforts of this program focus only on negation technologies which have temporary, localized, and reversible effects.											
(U) FY 1999 (\$ in Thousands) (U) \$480 Developed Space Control mission area requirements for the Air Force Space Surveillance Network. (U) \$1,350 Developed technologies for protection of space assets. (U) \$770 Developed techniques to prevent unauthorized use of next generation counter-navigation signals. (U) \$4,612 Developed technologies to counter surveillance, reconnaissance, and communications satellite systems. (U) \$7,212 Total											
(U) FY 2000 (\$ in Thousands) (U) \$1,450 Determine surveillance system deficiencies to meet Space Control requirements and assess technologies to satisfy mission needs. (U) \$2,320 Determine space system protection deficiencies. Assess requirements for protection of U.S. space systems and potential technologies to achieve required threat warning and attack reporting. (U) \$8,851 Continue to develop technologies to counter surveillance, reconnaissance, and communications satellite systems. (U) \$12,621 Total											
Project 642611										Exhibit R-2 (PE 0603438F)	

Page 1 of 5 Pages

439

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					
BUDGET ACTIVITY		PE NUMBER AND TITLE	DATE	PROJECT	
04 - Demonstration and Validation		0603438F Space Control Technology		February 2000 642611	
(U)	A. Mission Description Continued				
(U)	FY 2001 (\$ in Thousands)				
(U)	\$810	Develop potential technical solutions to address surveillance system deficiencies and identify the most promising technologies to pursue.			
(U)	\$900	Develop potential technical solutions to address space system protection shortfalls. Develop potential technical solutions to address threat warning and attack reporting shortfalls and determine reporting architecture and most promising technologies to pursue.			
(U)	\$700	Assess current space systems and other program elements to ensure all aspects of clarified prevention definition are being addressed.			
(U)	\$7,318	Continue to develop technologies to counter surveillance, reconnaissance, and communications satellite systems.			
(U)	\$9,728	Total			
(U)	B. Budget Activity Justification				
	This program is in budget activity 4 - Demonstration and Validation, because it supports the research, demonstration, and validation of Space Control technologies.				
(U)	C. Program Change Summary (\$ in Thousands)				
(U)	Previous President's Budget (FY 2000 PBR)		FY 1999	FY 2000	FY 2001
(U)	Appropriated Value		7,479	9,822	9,814
(U)	Adjustments to Appropriated Value		7,500	12,822	TBD
	a. Congressional/General Reductions		-21	0	
	b. Small Business Innovative Research		-227	0	
	c. Omnibus or Other Above Threshold Reprogram		0	-102	
	d. Below Threshold Reprogram		0	0	
	e. Rescissions		-40	-99	
	f. Other		0	0	
(U)	Adjustments to Budget Years Since FY 2000 PBR		0	0	-86
(U)	Current Budget Submit/FY 2001 PBR		7,212	12,621	9,728
(U)	Significant Program Changes:				
	FY01 -\$86K for higher priority Air Force programs				

Project 642611
Page 2 of 5 Pages
Exhibit R-2 (PE 0603438F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE			DATE		PROJECT		
04 - Demonstration and Validation		0603438F Space Control Technology			February 2000		642611		
(U) <u>D. Other Program Funding Summary (\$ in Thousands)</u>		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Total Cost
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete
(U) Not Applicable									
(U) <u>E. Acquisition Strategy</u>		Use the Air Force's modernization planning process to better define surveillance and protection technologies for study and for possible development in FY 2002 and beyond. This PE will influence Air Force Research Laboratory technology, Space and Missile System Center systems, and Electronic Systems Center space surveillance investments. Technologies to address counter surveillance, reconnaissance, and communications will be investigated toward capabilities identified in the AFSPC space control mission area plan.							
(U) <u>F. Schedule Profile</u>									
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	
		1	2	3	4	1	2	3	4
					*				
(U) SecDef Report to Congress									
(U) Air Force Space Control Technology Plan Approved									
(U) AFSPC Space Control Mission Area Plan Completion									
* = Completed Event X = Scheduled Event									X

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603438F Space Control Technology		February 2000 642611		
A. Project Cost Breakdown (\$ in Thousands)					FY 1999	FY 2000	FY 2001	FY 2000	FY 2001
(U)	Surveillance technology assessment				480	1,450	758		
(U)	Protection technology assessment				1,350	2,320	1,668		
(U)	Prevention technology development and definition				770	0	557		
(U)	Negation technology development				4,612	8,851	6,745		
(U)	Total				7,212	12,621	9,728		
B. Budget Acquisition History and Planning Information (\$ in Thousands)									
(U)	Performing Organizations:								
	Contract or	Contract							
	Government	Method/Type	Award or	Performing	Project				
	Performing	or Funding	Obligation	Activity	Office				
	Activity	Vehicle	Date	EAC	EAC				
	Product Development Organizations								
	SMC	Various							
	AFRL	Various							
	Support and Management Organizations								
	SMC	Various							
	Test and Evaluation Organizations								
	TBD								
(U)	Government Furnished Property:								
	Contract								
	Method/Type	Award or							
	or Funding	Obligation							
	Vehicle	Date							
	Product Development Property								
	None								
	Support and Management Property								
	None								
Project 642611					Page 4 of 5 Pages		Exhibit R-3 (PE 0603438F)		

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE				
04 - Demonstration and Validation		0603438F Space Control Technology			642611	
(U) Government Furnished Property Continued:						
Test and Evaluation Property						
None						
Subtotals						
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete	Total Program
		0	7,082	12,491	TBD	TBD
Subtotal Support and Management		0	130	130	TBD	TBD
Subtotal Test and Evaluation						
Total Project		0	7,212	12,621	TBD	TBD

Project 642611

Page 5 of 5 Pages

Exhibit R-3 (PE 0603438F)

Project 642611

Page 5 of 5 Pages

Exhibit R-3 (PE 0603438F)

443

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603441F Space Based IR Arch (Dem Val)(Space)								640007	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
640007	SBIRS Low	144,723	0	0	0	0	0	0	0	1,154,120	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	

(U) A. Mission Description

(U) The Space-Based Infrared System's (SBIRS) primary mission is to provide initial warning of a ballistic missile attack on the US, its deployed forces or its allies. SBIRS will incorporate new technologies to enhance detection; improve reporting of ICBM, SLBM and tactical ballistic missiles; and provide critical mid-course tracking and discrimination data for national and theater missile defense. This system will provide increased performance in order to meet requirements in US Space Command's Capstone Requirements Document and Operations Requirements Document. SBIRS will consist of satellites in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated centralized ground station serving all SBIRS space elements and Defense Support Program (DSP) satellites. SBIRS Low is the Low Earth Orbit (LEO) component of SBIRS. PE 305911F funds DSP and PE 604441F funds SBIRS High EMD activities. Program Definition contracts for the operational SBIRS Low system were awarded in August 1999 leading to a Milestone II decision and Engineering, Manufacturing and Development (EMD) start in 1QFY03. Subsequent to the formulation of the FY00 President's Budget, the flight demonstration contracts were terminated on 5 Feb 99 and the program restructured to provide for an expanded Program Definition and Risk Reduction (PDRR) phase. The Flight Demonstration System (FDS) and Low Altitude Demonstration System (LADS) have provided valuable lessons learned and risk reduction. Results of these demonstrations will support the Program Definition efforts for operational requirements trades/allocation and system concept development. The FY00 funds for the expanded PDRR contracts were appropriated in PE 060442F for PDRR efforts.

(U)	FY 1999 (\$ in Thousands)
(U)	\$74,000 FDS
(U)	\$33,992 LADS
(U)	\$15,359 Program office activities.
(U)	\$1,650 Simulation / Discrimination
(U)	\$5,502 FDS and LADS Support-Range support, launch services, TMD Targets (includes termination costs)
(U)	\$9,846 Technologies
(U)	\$774 Space Study
(U)	\$3,600 Increment 3 System of Systems
(U)	\$144,723 Total

Project 640007

Page 1 of 5 Pages

445

Exhibit R-2 (PE 0603441F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE			PROJECT
04 - Demonstration and Validation	0603441F Space Based IR Arch (Dem Val)(Space)			640007
(U) A. Mission Description Continued				
(U) FY 2000 (\$ in Thousands)				
(U) \$0 No Activity				
(U) \$0 Total				
(U) FY 2001 (\$ in Thousands)				
(U) \$0 No Activity				
(U) \$0 Total				
(U) B. Budget Activity Justification				
This program is funded in Budget Activity 4, Demonstration and Validation, because it funds risk reduction and advanced technology demonstrations.				
(U) C. Program Change Summary (\$ in Thousands)				
(U) Previous President's Budget (FY 2000 PBR)	FY 1999	FY 2000	FY 2001	Total Cost
(U) Appropriated Value	159,008	151,378	113,242	1,433,025
(U) Adjustments to Appropriated Value	160,262	0		
a. Congressional/General Reductions	-1,254			
b. Small Business Innovative Research	-5,261			
c. Omnibus or Other Above Threshold Reprogram	-8,215			
d. Below Threshold Reprogram	-809			
e. Rescissions				
f. Other				
(U) Adjustments to Budget Years Since FY 2000 PBR			-113,242	-278,905
(U) Current Budget Submit/FY 2001 PBR	144,723	0	0	1,154,120
(U) Significant Program Changes:				
Funding: The FY00 originally budgeted in this program element to complete the flight demonstration contracts are required for the expanded PDRR contracts and were appropriated in PE 0604442F. The FY01 funds were moved to PE 0604442F for the same purpose.				
Project 640007			Page 2 of 5 Pages	
			Exhibit R-2 (PE 0603441F)	

446

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603441F Space Based IR Arch (Dem Val)(Space)								640007	
(U)	D. Other Program Funding Summary (\$ in Thousands)										
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost	
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete		
(U)	PE #35922F - SBIRS Low	0	0	0	0	33,100	101,400	328,390	Continuing	TBD	
	Prod										
(U)	Related RDT&E:										
(U)	PE #604441F - SBIRS High	508,473	420,476	569,188	389,879	196,841	128,871	100,856	356,475	3,492,030	
	EMD										
(U)	PE #305911F - DSP	13,971	7,361	11,462	6,418	6,697	0	0	0	1,923,990	
(U)	PE #604442F - SBIRS Low	36,627	225,566	241,021	306,530	617,662	763,362	486,840	513,647	3,191,255	
	EMD										
(U)	E. Acquisition Strategy										
	(U) The SBIRS program is managed through a single consolidated System Program Office (SPO) at the Space and Missile Systems Center, Los Angeles, Air Force Base, CA. SBIRS Low began Program Definition activities in Aug 99 with the award of two firm fixed price contracts. Program Definition will be followed by a competitive contract award for EMD planned in 1QFY03 with SBIRS Low satellite deployment starting in 4QFY06.										
(U)	F. Schedule Profile										
		FY 1999			FY 2000			FY 2001			
		1	2	3	4	1	2	3	4		
(U)	Program Definition Contract Award					*					
Project 640007		Page 3 of 5 Pages				Exhibit R-2 (PE 0603441F)					

447

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT			640007			
04 - Demonstration and Validation		0603441F Space Based IR Arch (Dem Val)(Space)			640007						
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	Flight Demonstration System	FY 1999	FY 2000	FY 2001						FY 2001	
(U)	Low Altitude Demonstration System (LADS)	74,000	0	0						0	
(U)	Technologies	33,992	0	0						0	
(U)	Program office activities	9,846	0	0						0	
(U)	Simulation and Discrimination	15,359	0	0						0	
(U)	FDS and LADS Support	1,650	0	0						0	
(U)	Increment 3 System of Systems	5,502	0	0						0	
(U)	Space Study	3,600	0	0						0	
(U)	Total	774									
(U)		144,723	0	0						0	
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or Government	Contract Method/Type	Award or Obligation Date	Performing Activity	Project Office	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
	FDS - TRW	C/CPAF	May 95	TBD	686,951	611,893	74,000	0	0	0	685,893
	LADS - Boeing	SS/CPFF	Sep 96	TBD	208,136	170,744	33,992	0	0	0	204,736
	Non-Flyer Demo Work-Rockwell International	C/CPAF	May 95	130,643	130,643	130,643	0	0	0	0	130,643
	Misc. Contracts	Various	Various	TBD	TBD	39,551	18,728	0	0	0	58,279
	<u>Support and Management Organizations</u>										
	Aerospace		Various	N/A	N/A	33,907	11,315	0	0	0	45,222
	SETA/SPO Support	Various	Various	N/A	N/A	22,659	5,040	0	0	0	27,699
	<u>Test and Evaluation Organizations</u>										
	NMD Targets						1,648	0	0	0	1,648

Project 640007
Page 4 of 5 Pages
Exhibit R-3 (PE 0603441F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT	
04 - Demonstration and Validation		0603441F Space Based IR Arch (Dem Val)(Space)			640007	
(U) Government Furnished Property:						
Contract						
Item	Method/Type	Award or	Delivery			
Description	or Funding	Obligation	Date			
Product Development Property	Vehicle	Date				
Not Applicable						
Support and Management Property						
Test and Evaluation Property						
Subtotals						
Subtotal Product Development						
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project						

THIS PAGE INTENTIONALLY LEFT BLANK

PE NUMBER: 0603617F

UNCLASSIFIED

PE TITLE: Command Control and Communication Applications

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 2000	
BUDGET ACTIVITY													
04 - Demonstration and Validation													
PE NUMBER AND TITLE													
0603617F Command Control and Communication Applications													
Applications													
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost			
Total Program Element (PE) Cost		8,234	7,769	7,828	7,936	8,068	8,228	8,392	Continuing	TBD			
642314	Tactical Air Surveillance	444	446	448	452	458	466	476	Continuing	TBD			
642317	Tactical Air Information Production & Distribution	3,047	3,075	3,097	3,142	3,194	3,257	3,323	Continuing	TBD			
642321	Tactical Battle Information Management	4,540	4,029	4,060	4,109	4,177	4,261	4,346	Continuing	TBD			
643804	Tactical Air Forces Systems Integration	203	219	223	233	239	244	247	Continuing	TBD			
Quantity of RDT&E Articles		0	0	0	0	0	0	0	0	0			
(U) A. Mission Description													
This program is designed to rapidly transition development efforts in the science and technology base directly to warfighting commands. Projects are directly responsive to operational requirements for improved battle management, communications, theater missile defense (TMD), and surveillance capability. This program takes advantage of advanced information technology developments throughout the services and industry as well as off-the-shelf technology. The program develops, integrates and supports fielding of joint mission critical software applications to the Theater Battle Management Core Systems and the Air Force Global Command and Control System. The program develops, integrates and validates information distribution and assurance technologies in the areas of enterprise network management and control, defensive information warfare, and communications connectivity required for modernization and improvement of the Air Force Global Grid.													
(U) B. Budget Activity Justification													
This program is in Budget Activity 4, Demonstration and Validation, because its products are primarily advanced development models, rapid prototype efforts, and software developed through evolutionary acquisition methods.													
Exhibit R-2 (PE 0603617F)													

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	
BUDGET ACTIVITY		PE NUMBER AND TITLE			
04 - Demonstration and Validation		0603617F Command Control and Communication Applications			
		FY 1999	FY 2000	FY 2001	Total Cost
(U)	<u>C. Program Change Summary (\$ in Thousands)</u>				TBD
(U)	Previous President's Budget (FY 2000 PBR)	7,731	7,833	7,898	
(U)	Appropriated Value	7,770	7,833		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-39			
	b. Small Business Innovative Research	-208			
	c. Omnibus or Other Above Threshold Reprogram		-64		
	d. Below Threshold Reprogram	756			
	e. Rescissions	-45			
	f. Other				TBD
(U)	Adjustments to Budget Years Since FY 2000 PBR			-70	
(U)	Current Budget Submit/FY 2001 PBR	8,234	7,769	7,828	TBD
(U)	<u>Significant Program Changes:</u>				

Page 2 of 20 Pages

Exhibit R-2 (PE 0603617F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603617F Command Control and Communication								642314	
		Applications									
			FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
642314	Tactical Air Surveillance		444	446	448	452	458	466	476	Continuing	TBD
(U)	A. Mission Description										
	Develops and demonstrates advanced aerospace surveillance technology in support of next generation sensors and sensor signal processing. Investigates non-radar and/or adjunct radar sensors to address the Combat Air Forces (CAF) surveillance, detection, tracking and identification requirements not satisfied by an active radar.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$265	Continued Track Before Detect for TMD									
(U)	\$179	Initiated Ground Theater Air Control System (GTACS) Bistatic/Electronic Support Measures (ESM) System Definition									
(U)	\$444	Total									
(U)	FY 2000 (\$ in Thousands)										
(U)	\$203	Complete Track Before Detect for TMD									
(U)	\$166	Complete GTACS Bistatic/ESM System Definition									
(U)	\$77	Initiate GTACS Bistatic/ESM ground demonstration									
(U)	\$446	Total									
(U)	FY 2001 (\$ in Thousands)										
(U)	\$178	Complete GTACS Bistatic/ESM ground demonstration									
(U)	\$270	Initiate GTACS Bistatic/ESM airborne demonstration									
(U)	\$448	Total									
(U)	B. Project Change Summary										
	Not applicable										

Project 642314

Page 3 of 20 Pages

Exhibit R-2A (PE 0603617F)

453

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE										
04 - Demonstration and Validation		0603617F Command Control and Communication Applications										
(U)	C. Other Program Funding Summary (\$ in Thousands)											
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost		
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete			
(U)	RDT&E, AF (0603789F, Project 4072)	6,583	10,851	9,788	8,526	7,591	7,750	7,911	Continuing	TBD		
(U)	RDT&E, AF (0207412F, Project 485L)	423	467	450	436	426	435	375	Continuing	TBD		
(U)	D. Acquisition Strategy											
	All contracts in this project are awarded in full competition and are Cost Plus Fixed Fee (CPFF) or Cost Plus Award Fee (CPAF) as appropriate for advanced development.											
(U)	E. Schedule Profile											
		FY 1999		FY 2000		FY 2001						
		1	2	3	4	1	2	3	4			
(U)	Track Before Detect for TMD											
(U)	GTACS Bistatic/ESM System Definition											
(U)	GTACS Bistatic/ESM Ground Demo											
	Note: * represents a completed event; X represents a planned event.											

Project 642314

Page 4 of 20 Pages

Exhibit R-2A (PE 0603617F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

04 - Demonstration and Validation

0603617F Command Control and Communication

642314

Applications

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1999	FY 2000	FY 2001
(U) Primary Hardware Development	390	394	415
(U) Government Engineering Support	54	52	33
(U) Total	444	446	448

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

(U) Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget			Total Program
						FY 1999	FY 2000	FY 2001	
Product Development Organizations									
Hughes	C/CPFF	June 95	1,179	1,179	1,179	0	0	0	1,179
DSA	Tsk Ord	Apr 97	502	502	502	0	0	0	502
Northrop-Grumman	Agmt	Aug 98	488	488	0	287	204	0	491
Sensis	TBD	TBD	264	264	0	99	166	0	265
TBD	TBD	TBD	0	0	0	0	19	390	TBD
Support and Management Organizations									
AF Research Lab	In-house	n/s	N/A	N/A	6,419	58	57	58	TBD
Miscellaneous	Various	Various	N/A	N/A	0	0	0	0	TBD
Test and Evaluation Organizations									

Project 642314

Page 5 of 20 Pages

Exhibit R-3 (PE 0603617F)

455

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603617F Command Control and Communication Applications	642314	
		<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>
			<u>Budget FY 2000</u>
			<u>Budget FY 2001</u>
			<u>Budget to Complete</u>
			<u>Total Program</u>
<u>Subtotals</u>			
Subtotal Product Development		1,681	389
Subtotal Support and Management		6,419	58
Subtotal Test and Evaluation			58
Total Project		8,100	444
			448
			TBD
			TBD
			TBD

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE		PROJECT			
04 - Demonstration and Validation		0603617F Command Control and Communication		February 2000		642317			
		Applications							
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Total Cost
642317	Tactical Air Information Production & Distribution	3,047	3,075	3,097	3,142	3,194	3,257	3,323	TBD
<p>(U) A. Mission Description Integrates, demonstrates and transitions advanced information assurance and distribution technologies to acquisition organizations in support of the Integrated Command and Control System (IC2S). The goal is the creation of an assured, global information grid to support the warfighter and to support experimentation and demonstration processes (e.g. JEFX) to reduce the risk of transitioning advanced government or commercial information technologies into military enterprise systems. In coordinating with the strategic planning activities of AF/SC, AC2ISRC, HQ ESC, AFCA, ACC and AMC this project has been reorganized to more effectively demonstrate/validate the transition of AFRL technology into AF planned product acquisitions. The three program focus areas included in this project are; the Airborne Communication Relay (ACR) which provides for robust communications connectivity, the AF Comprehensive Enterprise Management (ACEM) which provides capabilities for C2 enterprise network management and control, and the AF Enterprise Defense (AFED) which incorporates defensive information assurance capabilities into AF enterprise systems.</p>									
(U)	<u>FY 1999 (\$ in Thousands)</u>								
(U)	\$441	Continued the airborne-transportable radio wideband/multi-band antenna developments							
(U)	\$811	Continue UAV radio electromagnetic interference/compatibility research and test for a communications UAV							
(U)	\$912	Continue the airborne-transportable radio wideband Power Amplifier (PA) development							
(U)	\$231	Initiate the transition of advanced development Project 2335 error mitigation hardware/software and deployable communications management software into deployable capability at Langley AFB, VA							
(U)	\$141	Initiate development of advanced, wideband suitcase satellite communications (SATCOM) capability							
(U)	\$511	Initiate effort to transition and demonstrate the (Proj 4519/DARPA) On Board Switch (OBS) technology for tanker relay and Phase 2 ACN applications							
(U)	\$3,047	Total							
(U)	<u>FY 2000 (\$ in Thousands)</u>								
(U)	\$167	Complete development of wideband/multiband antennas and prepare for transition to Phase 2 ACN and tanker relay platforms							
(U)	\$696	Complete evaluation of antenna placement issues for ACN platform							
(U)	\$697	Complete design of wideband PA and prepare for transition to Phase 2 ACN and tanker relay platforms							
(U)	\$595	Continue integration of technology to improve performance of commercial ATM over tactical media via error correction and channel							
Project 642317		Page 7 of 20 Pages		Exhibit R-2A (PE 0603617F)					

BUDGET ACTIVITY		DATE	
PROJECT		PROJECT	
PE NUMBER AND TITLE		PE NUMBER AND TITLE	
0603617F Command Control and Communication Applications		0603617F Command Control and Communication Applications	
04 - Demonstration and Validation		February 2000	
RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		0603617F Command Control and Communication Applications	
(U)	<u>A. Mission Description Continued</u>		
(U)	<u>FY 2000 (\$ in Thousands) Continued</u>		
(U)	management technologies		
(U)	Conduct field demonstration of suitcase SATCOM and assess suitability for airborne platforms		
(U)	Integrate software programmable radios with OBS capability into tanker relay demonstration		
(U)	Total		
(U)	<u>FY 2001 (\$ in Thousands)</u>		
(U)	Airborne Comm Relay (ACR)		
(U)	Air Force Enterprise Management (AFEM)		
(U)	Air Force Enterprise Defense (AFED)		
(U)	Total		
(U)	<u>B. Project Change Summary</u>		
	Project has been restructured to address the focus areas identified by AC2ISRC, specifically 'Enabling the Global Grid'. Three project programs were created to address this: Airborne Communications Relay (ACR), AF Comprehensive Enterprise Management(ACEM) and AF Enterprise Defense (AFED).		
(U)	<u>C. Other Program Funding Summary (\$ in Thousands)</u>		
		FY 1999 Actual	FY 2000 Estimate
(U)	RDT&E, AF (0602702F, Project 4519)	17,055	10,817
(U)	RDT&E, AF (0603789F, Project 2335)	3,907	4,093
(U)	RDT&E, AF (0603789F, Project 4216)	2,316	2,458
		FY 2001 Estimate	FY 2002 Estimate
		13,208	13,300
		FY 2003 Estimate	FY 2004 Estimate
		13,990	14,577
		FY 2005 Estimate	Cost to Complete
		16,026	Continuing
			Total Cost
			TBD
			TBD
			TBD

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

04 - Demonstration and Validation

0603617F Command Control and Communication

642317

Applications

(U) D. Acquisition Strategy

The Information Grid Division of the Air Force Research Laboratory's Information Directorate manages the acquisition of technology to be integrated via ESC's Global Grid and Defensive Information Warfare PAD's into acquisition programs such as Theater Deployable Communications (TDC) and the CITS/BITS programs. All contracts are awarded under full competition and include Cost Plus Fixed Fee (CPFF) and Cost Plus Award Fee (CPAF) as appropriate for advanced development efforts. All contracts use Evolutionary Prototyping, with heavy user participation.

(U) E. Schedule Profile

	FY 1999			FY 2000			FY 2001		
	1	2	3	4	1	2	3	4	1
(U) C2 Link				*					
(U) --JEFX 99 Demonstration		*							
(U) Deployable Asyn Transfer Mechanism (ATM)		*							
(U) -- Global Patriot & Ft Gordon exercises	*	*							
(U) --Proto HDWR installed Reachback Facility		*							
(U) Airborne Comm Relay (ACR)									X
(U) -- Phase I/II Demo						X			X
(U) -- Multi-Band Antenna Design								X	
(U) -- Wideband Power Amplifier Design								X	
(U) -- Phase III EFX Demo									
(U) AF Comp Enterprise Mgmt (ACEM)									X
(U) -- Validate Cmdr's C2 ACEM tools								X	X
(U) --Install ACEM tools in Proto HDWR								X	X
(U) AF Enterprise Defense (AFED)									
(U) --Version 1.0 prototype demo								X	
(U) --Expand to 4 ACC sites									X
(U) -- Integrate adv Defense Info Warfare s/w									X
(U) Info For Global Research (IFGR)									
(U) --Initiate AMC/TACC integration									X

Project 642317

Page 9 of 20 Pages

Exhibit R-2A (PE 0603617F)

459

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										
BUDGET ACTIVITY					DATE		PROJECT			
04 - Demonstration and Validation					0603617F Command Control and Communication Applications		February 2000 642317			
					PE NUMBER AND TITLE					
(U)	A. Project Cost Breakdown (\$ in Thousands)									
(U)	(U)	Primary Hardware/Software integration			FY 1999	FY 2000	FY 2001		FY 2001	
(U)	(U)	Government Engineering Support			2,838	2,592	0		2,610	
(U)	(U)	Contractor Engineering Support			184	192	0		196	
(U)	(U)	Total			25	291	0		291	
(U)	(U)				3,047	3,075	0		3,097	
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)									
(U)	Performing Organizations:									
	Contract or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to FY 2001 Complete	Total Program
	Product Development Organizations									
	GE Marconi		Sept 98	1,661	1,661	210	797	646	0	1,653
	BBN		Sept 96	1,370	1,370	0	217	545	0	1,355
	USAF C2BL	PD					147	0	0	147
	Various	TBD			TBD	0	1,382	1,369	Continuing	TBD
	Support and Management Organizations									
	AF Research Lab	In-house	N/A	N/A	N/A	12,153	207	220	Continuing	TBD
	MITRE		N/A	N/A	TBD		297	295	Continuing	TBD
	Test and Evaluation Organizations									
	Not Applicable									
(U)	Government Furnished Property:									
	Contract	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to FY 2001 Complete	Total Program	
Project 642317					Page 10 of 20 Pages					Exhibit R-3 (PE 0603617F)

460

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										
BUDGET ACTIVITY		PE NUMBER AND TITLE			DATE	PROJECT				
04 - Demonstration and Validation		0603617F Command Control and Communication Applications			February 2000	642317				
(U) Government Furnished Property Continued:										
Contract										
Item	Method/Type	Award or	Delivery							
	or Funding	Obligation	Date							
	Vehicle	Date								
Product Development Property										
Not Applicable										
Support and Management Property										
Test and Evaluation Property										
Subtotals										
Subtotal Product Development					Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Subtotal Support and Management					210	2,543	2,560	2,575	TBD	TBD
Subtotal Test and Evaluation					12,153	504	515	522	TBD	TBD
Total Project					12,363	3,047	3,075	3,097	TBD	TBD

Project 642317

Page 11 of 20 Pages

Exhibit R-3 (PE 0603617F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE		February 2000			
04 - Demonstration and Validation		0603617F Command Control and Communication				PROJECT 642321			
		Applications							
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete
642321	Tactical Battle Information Management	4,540	4,029	4,060	4,109	4,177	4,261	4,346	Continuing
									TBD
<p>(U) <u>A. Mission Description</u> Designs and integrates improvements to system software and Command Control (C2) applications via spiral development, rapid prototyping and maximum user participation in all design activities. Current focus is the functional development of the Joint Defensive Planner (JDP), designated by the Joint Staff (J6V) Joint Standards Air Operations Software Configuration Control Board as a joint application for use by all the Services. JDP will provide the single theater air and missile defense automated system that aids Joint air defense duty officers and the Area Air Defense Commander (AADC) and staff in planning the integrated employment of Defensive Counter-Air and Active and Passive Defenses in conjunction with Offensive Counter-Air, to destroy or neutralize enemy aircraft and theater missiles. Development is compliant with the Defense Information Infrastructure (DII) Common Operating Environment (COE) for integration into Theater Battle Management Core System (TBMCS) and the Global Command and Control System (GCCS). Future efforts respond to evolving concepts advocated by the Aerospace C2 & Intelligence Surveillance Reconnaissance Center (AC2ISRC). Emphasis is on Distributed Collaborative Dynamic Battle Management of Expeditionary Aerospace Forces (EAF) in areas such as planning, execution management, retasking (mission reflow), effects based operations, campaign assessment, atmospheric and space environmental effects on weapons and surveillance systems, and information warfare in support of Joint, Combined and Coalition Theater Air Operations.</p>									
(U)	<u>FY 1999 (\$ in Thousands)</u>								
(U)	\$710	Initiated FLEX integration into TBMCS V1.0.1							
(U)	\$692	Continued development of FLEX coordinated replanning (reflow) prototype							
(U)	\$3,138	Initiated integration of Joint Defensive Planner (JDP) as TBMCS DII COE compliant segments							
(U)	\$4,540	Total							
(U)	<u>FY 2000 (\$ in Thousands)</u>								
(U)	\$42	Complete initial DII COE FLEX coordinated replanning (reflow) prototype for TBMCS V2.X							
(U)	\$2,602	Continue Joint Defensive Planner (JDP) V2.0 software development							
(U)	\$1,192	Initiate integration activity for coordinated strategy-to-task for offensive (FLEX), Joint Defensive Planner (JDP), and information operations, including atmospheric environment impacts Prototypes for TBMCS V2.X							
(U)	\$193	Adapt Joint Defensive Planning, Air Tasking Order (FLEX) monitor and retasking for Battle Control Center							
(U)	\$4,029	Total							
Project 642321		Page 12 of 20 Pages		Exhibit R-2A (PE 0603617F)					

462

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE									
04 - Demonstration and Validation		0603617F Command Control and Communication Applications								February 2000	642321
(U)	<u>A. Mission Description Continued</u>										
(U)	FY 2001 (\$ in Thousands)										
(U)	\$1,407	Complete JDP software development and integration into TBMCS V 2.X									
(U)	\$497	Adapt JDP TBMCS V2.0 for GCCS-AF Integration									
(U)	\$596	Initiate effects based operations for joint aerospace operations									
(U)	\$1,000	Continue integration activity for coordinated strategy-to-task for offensive, defensive and information operations including atmospheric environment impacts prototypes for TBMCS V2.X									
(U)	\$560	Initiate decision aids for space environment impact effects on coordinated strategy-to-task for joint air operations									
(U)	\$4,060	Total									
(U)	<u>B. Project Change Summary</u>										
	Not Applicable										
(U)	<u>C. Other Program Funding Summary (\$ in Thousands)</u>										
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost	
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete		
(U)	RDT&E, AF (0603789F, Project 2335)	3,907	4,093	2,557	5,087	5,198	5,306	5,416	Continuing	TBD	
(U)	RDT&E, AF (0207438F, Project 4287)	11,972	0	0	0	0	0	0		TBD	
(U)	RDT&E, AF (0207438F, Project 4790)	0	23,007	20,439	18,120	17,682	20,433	20,859	Continuing	TBD	
(U)	<u>D. Acquisition Strategy</u>										
	The Systems Division of the Air Force Research Laboratory's Information Directorate manages the acquisition of technology under the direct guidance of the AC2ISRC. The objective is to integrate into the Theater Battle Management Core System (TBMCS) through a Memorandum of Understanding (MOU) entitled 'Shared management of TBMCS Technology Development' with the TBMCS System Program Office (SPO). As nominated by the Air Staff, some applications are designed for integration into the Air Force Global Command and Control System (GCCS-AF). All contracts are awarded under full competition and include Cost Plus Fixed Fee (CPFF) and Cost Plus Award Fee (CPAF) as appropriate for advanced development efforts. All contracts use the Spiral Development Model and Evolutionary Prototyping, with heavy user participation from all the Services, and produce joint software applications, as designated by the JCS Joint Standard Air Operations Software Configuration Control Board.										

Page 13 of 20 Pages

Exhibit R-2A (PE 0603617F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603617F Command Control and Communication Applications								642321	
		FY 1999		FY 2000		FY 2001					
		1	2	3	4	1	2	3	4		
(U)	<u>E. Schedule Profile</u>										
(U)	TBM Systems Integration Evaluation										
(U)	FLEX										
(U)	- TBMCS V1.0 integration	*									
(U)	- TBMCS V1.0.1 integration										
(U)	Replanning (reflow) prototype demo				*						
(U)	Joint Defensive Planner software development and integration										
(U)	- EP #2/3		*								
(U)	GCCS Integration										
(U)	- Functional Validation Model #1 & 2										
(U)	- TBMCS V x.x integration										
(U)	Battle Control Center Evaluations.										
(U)	Coordinated Strategy-to-task Spiral 1										
(U)	Coordinated Strategy-to-task Spiral 2										
(U)	Effects Based Operations Spiral 1										
Note: * represents a completed event; X represents a planned event											

Project 642321

Page 14 of 20 Pages

Exhibit R-2A (PE 0603617F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		February 2000		
04 - Demonstration and Validation					PE NUMBER AND TITLE		PROJECT		
					0603617F Command Control and Communication Applications		642321		
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>				FY 1999	FY 2000	FY 2001	Budget to Complete	Total Program
(U)	Software Development				3,266	3,046		0	10,071
(U)	Government Engineering Support				690	749		380	7,715
(U)	Contractor Engineering Support				584	234		Continuing	TBD
(U)	Total				4,540	4,029		Continuing	TBD
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>								
(U)	<u>Performing Organizations:</u>								
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001
	<u>Product Development Organizations</u>								
	Logicon	C/CPFF	June 94	9,782	9,782	9,114	912	45	
	PRB Assoc.	C/CPAF	Feb 97	7,435	7,435	1,496	2,500	2,324	1,015
	TBD							647	1,754
	<u>Support and Management Organizations</u>								
	AF Research Lab	In-house	N/A	N/A	TBD	27,423	642	779	921
	Lockheed Martin							115	193
	Litton/TASC						486	119	177
	Miscellaneous	Various	Various	N/A	TBD				
	<u>Test and Evaluation Organizations</u>								
	Not Applicable								

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 2000		PROJECT		
BUDGET ACTIVITY		PE NUMBER AND TITLE			642321		
04 - Demonstration and Validation		0603617F Command Control and Communication Applications			642321		
		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Subtotals							
Subtotal Product Development		10,610	3,412	3,016	2,769	TBD	TBD
Subtotal Support and Management		27,423	1,128	1,013	1,291	TBD	TBD
Subtotal Test and Evaluation							
Total Project		38,033	4,540	4,029	4,060	TBD	TBD

Project 642321

Page 16 of 20 Pages

Exhibit R-3 (PE 0603617F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE		February 2000							
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT							
04 - Demonstration and Validation		0603617F Command Control and Communication		643804							
		Applications									
		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
643804	Tactical Air Forces Systems Integration	203	219	223	233	239	244	247	Continuing	TBD	
(U)	A. Mission Description										
	Provides systems engineering and integration support to the Aerospace Command Control & Intelligence Surveillance Reconnaissance Center (AC2ISRC) development efforts. Project addresses integration and interoperability issues associated with AC2ISRC directed efforts, makes recommendations, identifies deficiencies, and establishes requirements for development efforts.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$103										
(U)	\$100										
(U)	\$203										
(U)	FY 2000 (\$ in Thousands)										
(U)	\$219										
(U)	\$219										
(U)	\$223										
(U)	\$223										
(U)	B. Project Change Summary										
	None										
(U)	C. Other Program Funding Summary (\$ in Thousands)										
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
(U)	Not Applicable										
Project 643804		Page 17 of 20 Pages								Exhibit R-2A (PE 0603617F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603617F Command Control and Communication		February 2000		
					PE NUMBER AND TITLE		643804		
					Applications				
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>				<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total</u>	
(U)	Systems Engineering								
(U)	Government Engineering Support				103	219		223	
(U)	Contractor Engineering Support				100				
(U)	Total				203	219		223	
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>								
(U)	<u>Performing Organizations:</u>								
	<u>Contractor or</u>	<u>Contract</u>	<u>Method/Type</u>	<u>Award or</u>	<u>Performing</u>	<u>Project</u>	<u>Total Prior</u>	<u>Budget</u>	<u>Budget to</u>
	<u>Government</u>	<u>Method/Type</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Activity</u>	<u>Office</u>	<u>to FY 1999</u>	<u>FY 1999</u>	<u>Budget to</u>
	<u>Performing</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>	<u>EAC</u>	<u>FY 2000</u>	<u>Complete</u>
	<u>Activity</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>	<u>EAC</u>	<u>FY 2001</u>	<u>Complete</u>
	<u>Product Development Organizations</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>	<u>EAC</u>	<u>FY 2000</u>	<u>Complete</u>
	ISX Corp	Task Order			100	100	0	100	100
	Support and Management Organizations								
	MITRE	SS/TO&P	Various		N/A	TBD	2,138	0	0
	AF Research Lab/AC2ISRC	In-house	N/A		N/A	TBD	132	219	223
	Miscellaneous	Various	Various		N/A	TBD	0	0	0
	Test and Evaluation Organizations								
(U)	<u>Government Furnished Property:</u>								
	<u>Contract</u>	<u>Method/Type</u>	<u>Award or</u>	<u>Delivery</u>	<u>Total Prior</u>	<u>Budget</u>	<u>to FY 1999</u>	<u>FY 1999</u>	<u>Budget to</u>
	<u>Item</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Date</u>	<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>Complete</u>
	<u>Description</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>	<u>FY 1999</u>	<u>FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>Complete</u>
	<u>Product Development Property</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>	<u>FY 1999</u>	<u>FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>Complete</u>
	Not Applicable								
	Support and Management Property								
	Not Applicable								
Project 643804					Exhibit R-3 (PE 0603617F)				

Page 19 of 20 Pages

469

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603617F Command Control and Communication Applications	643804	
(U) <u>Government Furnished Property Continued:</u>			
<u>Test and Evaluation Property</u>			
Not Applicable			
<u>Subtotals</u>			
Subtotal Product Development	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000
Subtotal Support and Management	0	100	219
Subtotal Test and Evaluation	2,270	103	223
Total Project	2,270	203	219
		Budget FY 2001	Budget to Complete
		223	TBD
		223	TBD
			Total Program
			100
			TBD
			TBD

Project 643804

Page 20 of 20 Pages

Exhibit R-3 (PE 0603617F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603690F Information Operations Technology								644856	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644856	Information Operations Technology	0	0	991	990	989	989	988	Continuing	TBD	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	

USAF has initiated action to consolidate funds from this Program Element with those in Program Element 0303140F. This consolidation is expected to be complete for the FY02 President's Budget.

(U) A. Mission Description

Information Operations (IO) Technology demonstrates and validates advanced technology-based capabilities and techniques to support tactical and operational commanders' and National Command Authorities' needs for offensive and defensive IO. The projects are oriented towards specific shortfalls and deficiencies documented by major commands (MAJCOMS), unified commands, and IO agencies in mission area plans and mission need statements. The labs and program office work directly with users and battle labs to set priorities and find synergistic combinations of new technology, doctrine and training. The goal of this program is to expedite technology transition from the laboratory and industry to operational use via rapid prototyping.

The Integrated Information Operations project will investigate and develop techniques and technologies for integrated IO. It will include a series of studies designed to assess cross-functional opportunities and capabilities to address various aspects of Integrated IO. Potential focus areas include integrated attack opportunities, defense opportunities, and integration of IO planning into air operations planning. Projects efforts will be prioritized and guided by the IO Technical planning Integrated Planning Team (TIPT) in support of the Air Force Counterinformation Mission Area Plan and the DOD IO Master Plan.

The initial study is investigating techniques and technologies for defending systems against sophisticated Information Warfare (IW) and computer network attacks that are beyond commercially available protection systems. Specific content is classified, and is available in the Panther Den (PD) Special Access Program (SAP) Report.

Later studies will investigate advanced information operations applications of emerging physics capabilities, communications capabilities, and intelligence applications to IO. Examples include exploiting emerging capabilities in directed energy, electronic sensors, and employing emerging capabilities to adversely effect information processing systems using non-kinetic weapons. Specific content is classified, and is available in the Panther Den SAP Report.

This program also funds the Panther Den program office at Hanscom AFB, MA. The Panther Den program office provides technical, program management, and security support to the programs funded by this PE, as well as PD-classified projects funded via other PEs. Details of the other PD-classified projects are contained in the Panther Den SAP report.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation		0603690F Information Operations Technology	644856
(U)	A. Mission Description Continued		
(U)	FY 1999 (\$ in Thousands)		
(U)	\$0	No Activity	
(U)	\$0	Total	
(U)	FY 2000 (\$ in Thousands)		
(U)	\$0	No Activity	
(U)	\$0	Total	
(U)	FY 2001 (\$ in Thousands)		
(U)	\$350	Directed Energy Application to IW	
(U)	\$75	Advanced IO Communication Application	
(U)	\$66	Advanced Intelligence Applications to IO	
(U)	\$300	Mitre Chief Engineer Support	
(U)	\$200	Program Office and Security Structure Support	
(U)	\$991	Total	
(U)	B. Budget Activity Justification		
	This program is in Budget Activity 4 - Demonstration and Validation, because it demonstrates and validates advanced technology which enhances IO systems, capabilities and techniques.		
(U)	C. Program Change Summary (\$ in Thousands)		
(U)	Previous President's Budget (FY 2000 PBR)	FY 1999	Total Cost
(U)	Appropriated Value	0	TBD
(U)	Adjustments to Appropriated Value		
	a. Congressional/General Reductions		
	b. Small Business Innovative Research		
	c. Omnibus or Other Above Threshold Reprogram		
	d. Below Threshold Reprogram		
	e. Rescissions	0	
	f. Other	0	TBD
Project 644856		Page 2 of 4 Pages	Exhibit R-2 (PE 0603690F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603690F Information Operations Technology	644856	
(U) C. Program Change Summary (\$ in Thousands) Continued			
(U) Adjustments to Budget Years Since FY 2000 PBR	FY 1999	FY 2000	FY 2001
(U) Current Budget Submit/FY 2001 PBR		0	500
(U) Significant Program Changes:			991
In FY01, \$500K was transferred from PE 0208021F, Information Warfare Support, to support information operations development in this program element.			TBD
(U) D. Other Program Funding Summary (\$ in Thousands)			
	FY 1999	FY 2000	FY 2001
(U) AF RDT&E	Actual	Estimate	Estimate
(U) Other APPN	Estimate	Estimate	Estimate
RELATED ACTIVITIES:			
PE 0603690F studies will leverage current DOD lab efforts. Studies will be deconflicted with and will complement Computer Security RDT&E and Information Warfare development efforts under PE 0303140F, Information Systems Security Program, and PE 0208021F, Information Warfare Support.			
Some aspects of this program will be protected under the PANTHER DEN Special Access Program. Data available upon request.			
(U) E. Acquisition Strategy			
All major contracts within this Program Element are awarded after full and open competition unless other than full and open is justified to the Designated Acquisition Commander (DAC).			
(U) F. Schedule Profile			
(U) Sophisticated IW Defense Study Start	FY 1999	FY 2000	FY 2001
(U) Directed Energy Application to IW	1	2	3
(U) Advanced IO Communication Application	4	1	2
(U) Advanced Intelligence Applications to IO		X	3
X - Denotes planned event			4
* - Denotes completed event			
Project 644856		Exhibit R-2 (PE 0603690F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY					
PE NUMBER AND TITLE					
04 - Demonstration and Validation				0603690F Information Operations Technology 644856	
(U)	A. Project Cost Breakdown (\$ in Thousands)			FY 1999	FY 2000
(U)	Directed Energy Application to IW			0	350
(U)	Advanced IO Communication Application				75
(U)	Advanced Intelligence Applications to IO				66
(U)	Mitre Chief Engineer Support				300
(U)	Program Office and Security Support			0	200
(U)	Total				991
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)				
(U)	Performing Organizations:				
	Contractor or Government	Contract	Method/Type or Funding Vehicle	Award or Obligation Date	Project Office EAC
	Performing Activity	Performing Activity	EAC	Total Prior to FY 1999	Budget FY 1999
	Product Development Organizations				Budget FY 2000
	Contractor TBD			0	350
	Contractor TBD				75
	Contractor TBD				66
	Support and Management Organizations				
	Electronic Systems Center				80
	Aegis, Inc (Security				120
	Contractor)				300
	Mitre (Engineering Support)				
	Test and Evaluation Organizations				
	Subtotals			Total Prior to FY 1999	Budget FY 1999
	Subtotal Product Development				Budget FY 2000
	Subtotal Support and Management			0	491
	Subtotal Test and Evaluation				500
	Total Project			0	TBD
				991	TBD
Project 644856				Exhibit R-3 (PE 0603690F)	

Page 4 of 4 Pages

474

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603742F Combat Identification Technology								642597	
		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
	COST (\$ in Thousands)										
642597	Noncooperative Identification Subsystems	5,109	7,334	10,933	11,495	12,488	17,039	20,045	Continuing		
	Quantity of RDT&E Articles	0	1	3	4	0	0	0	0	0	
<p>* Classified information can be provided upon request.</p> <p>(U) A. Mission Description</p> <p>(U) U.S. Combat Air Forces have a critical requirement to positively identify enemy, friendly, and neutral aircraft and battlefield equipment. Timely and reliable Combat Identification (CID) reduces fratricide, improves combat effectiveness, and enables the battlefield commander to effectively manage and control the battle. Such consequences have fostered the following operational requirements for CID systems:</p> <ul style="list-style-type: none"> · High confidence of ID · High probability of ID (friend, foe, and neutral) · All weather capable · Day/night capable · Worldwide operations capable <p>The Combat ID Technologies program element develops, demonstrates, and transitions promising target identification technologies to meet the requirements cited above. The Combat ID Technologies program element also conducts studies and analyses to quantify combat identification requirements and to identify optimal architecture and technologies for the fusion of target identification data into the Single Integrated Air and Ground Pictures and into systems such as the Joint Expeditionary Air Force Theater Battle Management System. Project 2597 funds the High Range Resolution (HRR) radar program; a Non-Cooperative Target Recognition technique code named HAVE CENTAUR. Project 2597 also develops and demonstrates the most promising air-to-ground combat techniques such as the Enhanced Recognition and Sensing Laser Radar (ERASER) program which is transitioning from PE 0603203F. A spiral development of the ERASER technology into the Advanced Targeting Pod is being conducted under the Laser Vision Program within Project 2597.</p> <p>(U) <u>FY 1999 (\$ in Thousands)</u></p> <p>(U) \$2,085 Conducted HAVE CENTAUR algorithm validation, continue synthetic target database development, provide test support and initiate avionics architectural analysis for incorporation of HRR capability into follow-on platform.</p> <p>(U) \$1,499 Continued development and demonstration of promising air-to-ground and air-to-air identification techniques for reduced battlefield fratricide and enhanced mission performance including ERASER program transitioning from PE 63203F.</p>											

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation		0603742F Combat Identification Technology	642597
(U)	<u>A. Mission Description Continued</u>		
(U)	<u>FY 1999 (\$ in Thousands) Continued</u>		
(U)	\$461	Air-to-Ground (A/G) CID study. Analyze selected systems to determine mission effectiveness, optimal system CID requirements and optimal A/G CID system architecture.	
(U)	\$450	Funded AIMS Program Office support of next generation IFF equipment integration with current IFF capabilities.	
(U)	\$614	CID Integrated Management Team and engineering support for integration and management of Air Force CID programs, conducting related analysis to increase warfighter's CID capabilities.	
(U)	\$5,109	Total	
(U)	<u>FY 2000 (\$ in Thousands)</u>		
(U)	\$1,080	Conduct HAVE CENTAUR algorithm validation, continue synthetic target database development, initiate transition of the synthetic target database to Air Force Information Warfare Center (AFIWC) and National Air Intelligence Center (NAIC) in preparation for fielding of the HRR capability and provide test support.	
(U)	\$5,130	Continue development and demonstration of promising air-to-ground and air-to-air identification techniques for reduced battlefield fratricide and enhanced mission performance, including ERASER program. Begin implementation of Laser Vision Phase I to demonstrate 2-D eyesafe laser imaging (ERASER) technology on an operational fighter targeting pod. The Laser Vision Phase I is a continuation of the development of the enhanced mission performance for the ERASER program.	
(U)	\$360	Funds AIMS Program Office support of next generation IFF equipment integration with current IFF capabilities.	
(U)	\$764	CID Integrated Management Team and engineering support for integration and management of Air Force CID programs, conducting related studies/demos to increase warfighter's CID capabilities.	
(U)	\$7,334	Total	
(U)	<u>FY 2001 (\$ in Thousands)</u>		
(U)	\$3,170	Continue HRR synthetic target database development, continue transition of the HRR synthetic target database to AFIWC and NAIC and provide test support.	
(U)	\$1,000	Continue development and demonstration of other promising air-to-ground and air-to-air identification techniques for reduced battlefield fratricide and enhanced mission performance, including ERASER program.	
(U)	\$5,640	Continue Laser Vision Phase I to demonstrate 2-D eyesafe laser imaging (ERASER) technology on an operational fighter targeting pod. Initiate Phase II of Laser Vision Project to conduct tactics, techniques and procedures development with ERASER equipped targeting pods.	
(U)	\$380	Funds AIMS Program Office support of next generation IFF equipment integration with current IFF capabilities.	
(U)	\$743	CID Integrated Management Team and engineering support for integration and management of Air Force CID programs, conducting related	
Project 642597		Page 2 of 8 Pages	
		Exhibit R-2 (PE 0603742F)	

476

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603742F Combat Identification Technology	642597	
(U) A. Mission Description Continued			
(U) FY 2001 (\$ in Thousands) Continued	studies/demos to increase warfighter's CID capabilities.		
(U) \$10,933	Total		
(U) B. Budget Activity Justification			
	This program is in Budget Activity 4 - The PE includes advanced technology demonstrations that help transition technologies from laboratory to operational use.		
(U) C. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget (FY 2000 PBR)		FY 1999	FY 2000
(U) Appropriated Value		6,158	7,393
(U) Adjustments to Appropriated Value		6,177	7,393
a. Congressional/General Reductions		-19	
b. Small Business Innovative Research		-198	
c. Omnibus or Other Above Threshold Reprogram		-822	-59
d. Below Threshold Reprogram		-29	
e. Rescissions			
f. Other			
(U) Adjustments to Budget Years Since FY 2000 PBR			2,404
(U) Current Budget Submit/FY 2001 PBR		5,109	7,334
(U) Significant Program Changes:			
	Begin implementation of Laser Vision Program in FY00 as spiral development of ERASER technology to demonstrate technology maturity for the Advanced Targeting Pod and Joint Strike Fighter, this initiative is a continuation of the enhanced development for the ERASER program. The Air Force added funds in FY01 for HAVE CENTAUR target database development and transition.		
(U) D. Other Program Funding Summary (\$ in Thousands)			
		FY 1999	FY 2000
		Actual	Estimate
		0	0
(U) None			
		FY 2001	FY 2002
		Estimate	Estimate
		0	0
		FY 2003	FY 2004
		Estimate	Estimate
		0	0
		FY 2005	Cost to Complete
		0	0
			Total Cost
			0
Project 642597		Exhibit R-2 (PE 0603742F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603742F Combat Identification Technology								642597	
(U) E. Acquisition Strategy											
The HAVE CENTAUR program development was awarded under a competitive bid process. Other combat identification efforts in project 2597 also focus on developing and demonstrating the most promising Air-to-Ground Combat ID techniques and will also be contracted for under a competitive Request For Proposal (RFP) process.											
(U) E. Schedule Profile											
(U)	1. (U) HRR Platform Suite Efforts										
(U)	Radar Enhancement Test Completion										
(U)	DT&E Completion										
(U)	OT&E Completion										
(U)	2. (U) HRR Classifier Dev/Qual										
(U)	Airborne Data Collection Complete										
(U)	Classifier/Target Library Complete										
(U)	Software Design Review										
(U)	OFP Prel. Design Review										
(U)	OFP Critical Design Review										
(U)	3. (U) ERASER										
(U)	Contract Award										
(U)	Systems Requirements Review										
(U)	Ground Based Demo of Flight H/W										
(U)	Flight Demo of 1.06 micron system										
(U)	Flight Demo of 1.57 Micron System										
(U)	4. (U) LASER VISION										
(U)	Industry Days										
(U)	Phase I RFP Release										
(U)	Phase I Contract Award(s)										
(U)	System Integration & Ground Tests										
(U)	Flight Demo with Targeting Pod(s)										
(U)	Phase II Contract Award										

Project 642597

Page 4 of 8 Pages

Exhibit R-2 (PE 0603742F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603742F Combat Identification Technology	642597		
(U) <u>F. Schedule Profile Continued</u>				
		FY 1999	FY 2000	FY 2001
1	2	3	4	1
				2
				3
				4
* denotes completed events X denotes planned events				
<div>Project 642597</div> <div>Page 5 of 8 Pages</div> <div>Exhibit R-2 (PE 0603742F)</div>				

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE									
04 - Demonstration and Validation		0603742F Combat Identification Technology									February 2000
											642597
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	Analysis/Modeling and Simulation, Studies, Plans and Reports	FY 1999	FY 2000	FY 2001	Budget	Budget	Budget	Budget	Budget	FY 2001	
(U)	Data Synthesis, Algorithm Development, Database Support	979	0	0	0	0	0	0	0	0	
(U)	Hardware/Software and Prime Mission Product	1,875	1,080	5,030	0	0	0	0	0	3,170	
(U)	CID IMT and AIMSP0 Training, Travel, & Operations	900	5,030	924	0	0	0	0	0	4,740	
(U)	Flight Test	864	924	100	0	0	0	0	0	923	
(U)	JCIDO Support	5	200	0	0	0	0	0	0	1,900	
(U)	Reductions to fund other AF or DoD requirements	486	0	0	0	0	0	0	0	200	
(U)	Total	5,109	7,334	0	0	0	0	0	0	10,933	
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or Government	Method/Type	Award or Obligation	Performing Activity	Project Office	Total Prior	Budget	Budget	Budget	Total	
	Activity	Vehicle	Date	EAC	EAC	to FY 1999	FY 1999	FY 2000	FY 2001	Program	
	Reduction to fund other AF or DoD requirements										
	<u>Product Development Organizations</u>										
	Raytheon Co, El Segundo	CA	CPFF	39,600	39,600	39,600	0	0	0	39,600	
	Raytheon Co, El Segundo	CA	CPFF	12,625	12,625	0	700	200	200	TBD	
	Westinghouse Elec Co	CPFF	Aug 93	1,780	1,780	0	0	0	0	1,780	
	McDonnell Douglas	AF616	Aug 94	3,550	3,550	0	0	0	0	3,550	
	Veridian (Veda), Dayton, OH	CPFF	Aug 94	12,221	12,221	0	0	0	0	12,221	
	Veridian (Veda), Dayton, OH	CPFF	Aug 98	13,000	13,000	0	877	600	2,020	TBD	
	Simulation Support, Inc.	CP	May 99	330	330	0	330	0	0	330	
	National Air Intel Center	AF616	Annually	3,329	3,329	0	0	0	0	3,329	
	Northrop Grumman Corp	CPFF	Aug 93	2,270	2,270	1,956	210	0	0	2,166	
	Northrop Grumman Corp	TBD	Jan 01	TBD	TBD	0	0	0	0	TBD	
	ERASER-Raytheon, Plano	CPFF	Dec 97	5,532	5,532	1	700	1,170	1,000	TBD	

Project 642597
Page 6 of 8 Pages
Exhibit R-3 (PE 0603742F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000					
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT						
04 - Demonstration and Validation		0603742F Combat Identification Technology		642597						
(U) Performing Organizations Continued:										
Product Development Organizations										
TX										
Combat Identification	OTA	Jan 00	TBD	TBD	0	0	3,860	2,040	Continuing	TBD
Integrated Management										
Team, ESC/SRC, Hanscom										
AFB, MA										
Patuxent River Naval Res	MIPR	Feb 99/Apr 99	200	200	0	200	0	0	0	200
Ft Monmouth, SADL-JTIDS	MIPR	Mar 99	308	308	0	308	0	0	0	308
Gateway										
Demeco, Inc	CPFF	Aug 94	9,004	9,004	6,604	0	0	0	0	6,604
SAIC (Demaco, Inc)	CPFF	May 99	2,210	2,210	0	300	220	890	Continuing	TBD
Cyberdynamics	CPFF	May 99	2,112	2,112	0	66	0	0	Continuing	TBD
AIMS Program Office	MIPR	Annual	TBD	TBD		250	360	380	Continuing	TBD
Wright Laboratory (Laser	MIPR	Jan 01	TBD	TBD	0	0	0	2,000	Continuing	TBD
Vision Analysis & ATR development)										
Support and Management Organizations										
Georgia Tech Res Inst.	CPFF	Aug 94	1,978	1,978	1,978	0	0	0	0	1,978
(GTRI)										
USAF Combat ID IMT and	Various	N/A	TBD	TBD		614	764	743	Continuing	TBD
Engineering Support										
Wright Laboratory (HRR)	MIPR	N/A	4,000	4,000	2,332	63	60	60	Continuing	TBD
Test and Evaluation Organizations										
3246th Test Wing, Eglin	Mixed, CPF,	N/A	3,769	3,769	2,319	0	0	0	Continuing	TBD
AFB, FL 544th Range										
Group, Nellis AFB, NV										
412 Test Wing, Edwards AFB	MIPR	N/A	1,605	1,605	0	5	100	1,600	0	1,705
Project 642597						Page 7 of 8 Pages		Exhibit R-3 (PE 0603742F)		

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE		0603742F Combat Identification Technology			642597
04 - Demonstration and Validation							
Subtotals		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
			486				486
Subtotal Product Development		69,041	3,941	6,410	8,530	TBD	TBD
Subtotal Support and Management		4,310	677	824	803	TBD	TBD
Subtotal Test and Evaluation		2,319	5	100	1,600	TBD	TBD
Total Project		75,670	5,109	7,334	10,933	TBD	TBD

Project 642597

Page 8 of 8 Pages

Exhibit R-3 (PE 0603742F)

Project 642597

Page 8 of 8 Pages

Exhibit R-3 (PE 0603742F)

482

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603790F NATO Cooperative R&D								64NATO	
		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
64NATO	Nato Coop R&D	3,956	4,222	5,509	11,685	11,885	12,123	12,363	Continuing	21,257	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	
(U)	A. Mission Description These funds will be used to help implement international cooperative research, development, and acquisition (ICRD&A) agreements with NATO and major non-NATO allies (Australia, Egypt, Israel, Japan, and Korea). The program implements the provisions of Title 10 U.S. Code, Section 2350a on NATO Cooperative Research and Development (R&D). The program was established to improve cooperation among NATO nations, and later major non-NATO allies, in research, development, and production. The legislation authorized funds to significantly improve US and allied conventional defense capabilities by leveraging the world's best defense technologies, eliminating costly duplication of research and development efforts, accelerating the availability of defense systems, and promoting US and allied interoperability or commonality. Starting in FY00 these funds will focus on implementing coalition warfare technology and demonstrations that address Air Force space, command, control, communications, intelligence, surveillance, and reconnaissance (C3ISR), modernization and readiness needs in support of the National Military Strategy, Joint Vision 2010, and the Air Force's Strategy of Global Engagement. The planned program is shown below. The final program will be reported separately as required by Title 10 U.S. Code, Section 2350a(f). This program element funds the implementation of Air Force ICRD&A agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Demonstration and Validation (5) Engineering and Manufacturing Development and (6) RDT&E Management Support.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$195	Effects of the Ionosphere on Command, Control, Communications, and Intelligence (C3I) Systems (Air Force Research Laboratory (AFRL)/United Kingdom (UK)) - Cooperative project to leverage complementary ionospheric sensors and data to develop capabilities for timely warning of ionosphere disturbances that disrupt C3I systems. In FY 99 the project installed ionospheric sensors on Guam to expand the coverage area for which C3I system outage forecasts and alerts can be provided; and the concept of a ground-based, rapidly deployable, Space Weather Station (SWS), employing multiple sensors and battlespace environment models to specify ionospheric and radio wave propagation conditions, was demonstrated in a field program on Ascension Island.									
(U)	\$106	Free Piston Shock Tunnel (FPST)/High Enthalpy Goettingen Project (HEG) (Arnold Engineering and Development Center (AEDC)/Germany) - Cooperative project to significantly reduce the cost of acquiring technologies and ground test capabilities for the development of hypersonic flight systems by combining the complementary efforts of the US FPST and Germany's HEG facilities. In FY 99 the project tested the FPST and the HEG. Data reduction from the test entries was largely completed. Analyzed data on computational fluid dynamics (CFD), and CFD code development was accomplished. The final report has been drafted.									

Project 64NATO

Page 1 of 22 Pages

Exhibit R-2 (PE 0603790F)

483

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation		0603790F NATO Cooperative R&D	64NATO	
(U)	A. Mission Description Continued			
(U)	FY 1999 (\$ in Thousands) Continued			
(U)	\$1,000	Dense Metal Case Penetrating Weapon (DMCPW) (AFRL/UK) - Cooperative project to develop and demonstrate technology for a dense metal penetrating warhead. This technology offers a two-fold increase in hard target penetration over current warhead case designs. The warhead will be compatible for carriage and release with future smaller aircraft, and stand-off weapons such as cruise missiles. Technology demonstration will be through sub-scale and full-scale dynamic ground impact testing (sled and/or powder gun). In FY 99 the project completed the DMCPW warhead detailed design, development, and fabrication of scaled/full scaled penetrator designs for the test program which will be accomplished in FY 00.		
(U)	\$250	Cooperative Research and Development Efforts in Imaging Spectrometer Development (AEDC/Canada) - Cooperative project to pool the spatial and spectral advances of both the US and Canada, and develop a high-resolution sensor system capable of characterizing signatures of rockets and aircraft, for drug interdiction, and identifying trace quantities of a broad spectrum of gases in the environment. In FY 99 the project investigated data collection issues associated with imaging spectroscopy. Prototype data collection and analysis was accomplished.		
(U)	\$100	Metal Matrix Composites (MMCs) for Aerospace Applications (AFRL/UK) - Cooperative project to improve the properties and processing of silicon carbide (SiC) -reinforced Titanium (Ti) - alloy and Aluminum (Al) - alloy metal matrix composites for aerospace applications. In FY 99, the relationships between the structure and properties of carbon coatings were determined. Coating deposition parameters were defined. Carbon coated SiC fibers were produced by the UK and evaluated by the AFRL. Transverse testing of matrix-coated fibers were completed and specification of matrix-coated fibers were defined. A joint project to improve the mechanical properties of SiC-reinforced Al was defined and initiated.		
(U)	\$105	Refractive Turbulence (AFRL/Australia) - Cooperative project to investigate specific and potential refractive turbulence-induced mission-limiting performance degradations on airborne military microwave radar surveillance, infrared (IR) laser and IR/microwave long range communication systems. The data reduction analysis and modeling of refractivity and turbulence measurements is essential to support studies that evaluate atmospheric refraction propagation effects on the design/performance of the Airborne Laser (ABL). In FY 99 the project supported data reduction and analysis of aircraft turbulence measurements in both Japan/Korea and Australia winter jetstreams.		
(U)	\$200	Integrated Tactical Aircraft Control (ITAC) Program (AFRL/France) - Cooperative project to develop, integrate and demonstrate critical flight control and flight management technologies that enable cooperative flight operations of a package comprised of manned and uninhabited combat air vehicles (UCAVs). The cooperative control architecture enables management and control of an integrated strike package by the aircrews in the combat aircraft. In FY 99 the project completed system level definition and initiated detailed design. The design approach is based on software agents. Twenty seven software agents were identified and development responsibilities assigned. The functional descriptions and initial input/output (I/O) definitions were defined for each agent. A common scenario was developed. Flight control algorithms, situation assessment methods, flight management and health monitoring system requirements were identified.		
Project 64NATO		Page 2 of 22 Pages		Exhibit R-2 (PE 0603790F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation		0603790F NATO Cooperative R&D	64NATO
(U)	A. Mission Description Continued		
(U)	FY 1999 (\$ in Thousands) Continued		
(U)	\$300	Anthropometric Accommodation in Crew Systems (AFRL/The Netherlands) - Cooperative project to establish (a) a collection of three-dimensional (3-D) anthropometric data which accurately and consistently describes the variability of men and women in both Europe and the US; (b) high quality methods for accommodation and interoperability assessment of crew systems; and (c) method for combining the database with the assessment methods to assure accommodation and interoperability is achieved in the design process. In FY 99 the project finished 75% the US 3-D data collection and 25% of the European and initiated the augmented reality assessment of the aircraft crewstations.	
(U)	\$700	Advanced Hybrid Propulsion Technologies Cooperative Research Project (AFRL/Japan) - Cooperative project to develop hybrid propulsion technology for air-to-air missiles. In FY99 the project developed the subsystem components necessary to meet the overall project requirements of increased performance and safety, as well as providing energy management capability. The subsystem components include an injector, gas generator pressurization system, flow control valve, liquid oxidizer expulsion system, oxidizer chemistry development, and oxidizer tankage.	
(U)	\$1,000	Advanced Crew Ejection Seat (ACES) II - Ejection Seat Cooperative Modification Project (Human Systems Center (HSC)/Japan) - Cooperative project to develop and design a modification kit that can be retrofitted to the ACES II ejection seat to increase safety and survivability of light weight aircrew members by: increasing seat stability; increasing seat/accommodation range; and adding limb restraints. ACES II ejection seat improvements include a gender free operational capability to assure equally reduced mortality rate and serious injuries for male and female aircrew members. The completion of this program is intended to reduce the number of fatalities and serious injuries for all weight classes during high speed ejections and increase anthropometric range for aircrew population requirements. The design stages were completed and the qualification program will be initiated in FY 00.	
(U)	\$3,956	Total	
(U)	FY 2000 (\$ in Thousands)		
(U)	\$213	Effects of the Ionosphere on C3I Systems (AFRL/UK) - Cooperative project to leverage complementary ionospheric sensors and data to develop capabilities for timely warning of ionospheric disturbances that disrupt C3I systems. In FY 00 a prototype ground-based SWS, employing multiple sensors and multiple battlespace environment models to specify ionospheric and radio wave propagation conditions, will be operated in the UK, to demonstrate its potential for future, in-theater support of operation C3I systems.	
(U)	\$100	FPST/HEG Project (AEDC/Germany) - Cooperative project to significantly reduce the cost of acquiring technologies and ground test capabilities for the development of hypersonic flight systems by combining the complementary efforts of the US FPST and Germany's HEG facilities. Activities in FY 00 will include the final analysis of the data from the FPST and the HEG tests, final evaluation of non-intrusive diagnostics in the laboratory shock tunnel, and the editing and final preparation of the report.	
(U)	\$75	Geoscience Space Mission/Cooperative Space Measurements (AFRL/Germany) - Cooperative project to fly a Department of Defense developed space plasma detector aboard a German scientific spacecraft. Joint exchange and analysis of scientific data from this mission will be used to	
Project 64NATO		Page 3 of 22 Pages	
		Exhibit R-2 (PE 0603790F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
04 - Demonstration and Validation	0603790F NATO Cooperative R&D		64NATO
(U) A. Mission Description Continued			
(U) FY 2000 (\$ in Thousands) Continued			
	develop better descriptive and predictive models of the space environment, enhancing the reliability of space-based communications and navigation capabilities for the US and its allies. In FY 99 the Flight Model of the plasma instrument was delivered to Germany for integration on board the satellite. Launch of the satellite is scheduled for FY 00.		
(U) \$334	Advanced Combustor Chamber Concepts Program (AFRL/France) - Cooperative project to develop and demonstrate a composite combustor structure suitable for use in advanced hypersonic weapon systems operation to Mach 8 on liquid hydrocarbon fuels. During FY 00 fabrication of a composite panel will be completed. Testing of this panel at Mach 7 flight conditions will demonstrate liquid hydrocarbon fuel-cooled operation, thus paving the way for design and testing of a complete composite combustor section. Engines that utilize this type of composite structure will be simpler, easier to cool, lower weight, and more durable than baseline metallic designs.		
(U) \$600	ITAC Program (AFRL/France) - Cooperative project to develop, integrate and demonstrate critical flight control and flight management technologies that enable cooperative flight operations of a package comprised of manned and UCAVs. The cooperative control architecture enables management and control of an integrated strike package by the aircrews in the combat aircraft. In FY 00 work will continue in the development of the agent/algorithms. Functional descriptions of the agents and their interrelationships will be further refined. A desktop development tool/simulation will be the initial product supporting evaluation of the design and early demonstration of it's utility.		
(U) \$300	Anthropometric Accommodation in Crew Systems (AFRL/The Netherlands) - Cooperative project to establish (a) a collection of three-dimensional (3-D) anthropometric data which accurately and consistently describes the variability of men and women in both Europe and the US; (b) high quality methods for accommodation and interoperability assessment of crew systems; and (c) methods for combining the database with the assessment methods to assure accommodation and interoperability is achieved in the design process. In FY 00 the project will finish both the US and the Dutch data collection, the augmented reality assessment of the aircraft crewstations, and perform accommodation effect assessments using US and Dutch data sets.		
(U) \$400	Aging Aircraft Life Prediction/Extension (AFRL/Australia) - Cooperative project to investigate the damage that can degrade an aircraft's service life, and develop the technology to ensure the structural integrity of aging aircraft with such damage present. This project will focus on composite patch repairs of metallic structures, widespread fatigue damage including multiple-element damage and multiple site damage, techniques for predicting the effects of corrosion and the interaction with fatigue loads, and sensors for structural health monitoring. In FY 00 the project will complete documenting experience with widespread fatigue damage and composite patch repairs, continue developing analysis techniques for corrosion/fatigue, continue evaluating composite patch repair and analysis techniques, and perform in-service evaluation of corrosion sensor.		
(U) \$350	Structural Integrity of Aging Aircraft (AFRL/Canada) - Cooperative project to investigate the damage that can degrade an aircraft's service life, and develop the technology to ensure the structural integrity of aging aircraft with such damage present. This project will focus on composite patch repairs for metallic structures, widespread fatigue damage, life extension techniques for metallic structures, corrosion and its interaction		
Project 64NATO		Page 4 of 22 Pages	Exhibit R-2 (PE 0603790F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE			
04 - Demonstration and Validation	0603790F NATO Cooperative R&D		February 2000	64NATO
(U) A. Mission Description Continued				
(U) FY 2000 (\$ in Thousands) Continued				
(U) \$250		with fatigue, structural dynamics with emphasis on weapon bay acoustics, and structural health monitoring with emphasis on sensor development. In FY 00 the project will develop analytical models for widespread fatigue damage and corrosion/fatigue, complete evaluation of composite patch repair techniques, and identify in-service dynamic problems.		
(U) \$250		Airworthiness of Aging Aircraft (AFRL/UK) - Cooperative project to investigate the damage that can degrade an aircraft's service life, and develop the technology to ensure the structural integrity of aging aircraft with such damage present. This project will focus on composite patch repairs for metallic structures, techniques for predicting the effects of corrosion and the interaction with fatigue loads, and structural life extension techniques for metal structures, such as the fastener-hole cold expansion process. In FY 00 the project will continue analysis techniques for corrosion/fatigue and continue developing analysis techniques for life enhancement and composite patch repairs.		
(U) \$250		Air Command, Control, Communications and Intelligence (C3I) Capabilities (Electronic Systems Center (ESC)/NATO Consultation, Command, and Control (C3) Agency) - Cooperative project to develop an operationally robust interface between the US Contingency Theater Automated Planning System/Theater Battle Management Core System (CTAPS/TBMCS) and NATO Initial Combined Air Operations Center (CAOC) Capability (ICC) as well as the future NATO Air Command and Control System (ACCS). This cooperative R&D effort will support air campaign planning and execution for joint and combined air operations. The scope of work to be accomplished includes advanced R&D into shared data environment, developing a concept of operation for the transfer of control between national and NATO C4I systems without interrupting combat operations; and the extension of a middleware/translator product needed for the successful prosecution of a combined/joint air operation.		
(U) \$250		Coalition C3 Demonstration Environment (CC3DE) (AFRL/Australia, Canada) - Cooperative project to improve the efficiency of future coalition operations capabilities through the development of interoperable C3. This project will initially explore the effective management of information system resources in a coalition environment. It will develop a management architecture for the coalition environment, and develop the tools to implement this architecture. In particular, Asynchronous Transfer Mode (ATM) technology will be integrated into a Broadband-Integrated Services Digital network (B-ISDN) in efforts to form a common international standard for networking. In FY 00 this project will attach a management node to Combined Federated Battle Lab Network (CFBLNet) in order to investigate/experiment with Coalition network management (CNM) issues.		
(U) \$250		Advanced Transmission Language and Allocation of New Technology for International Communication and Proliferation of Allied Waveforms (ATLANTIC PAW) (AFRL/France, Germany, UK) - Cooperative project to develop a common waveform syntax allowing for joint allied communications that will be demonstrated on programmable radio systems in each of the participating nations. Joint compliance testing commenced in FY 99 and will be completed this year with multinational communication assets to assure interoperability on a functional level. In FY 00 joint compliance testing will be conducted by using the previously designed Future Multiband Multiwaveform Modular Tactical Radio (FM3TR) waveform and newly designed multinational radio platforms. This compliance test will verify the interoperability of the basic		

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	64NATO	
(U) A. Mission Description Continued			
(U) FY 2000 (\$ in Thousands) Continued			
(U) \$100	equipment that is required for the Atlantic Paw effort. Modifications resulting from the compliance testing will be integrated into the international agreement. The initial design and tool characterization of the international waveform interpreter and language development will also commence in this year.		
(U) \$250	Space Radiation Sensors (AFRL/UK) - Cooperative project to validate the performance of a key Air Force spacecraft instrument for the measurement of space environment radiation hazards. The instrument's capability of issuing real-time space hazard warnings will be tested under a variety of conditions encountered in space aboard a joint US/UK satellite mission. In FY 00 the project will develop the preliminary space radiation data base using the US and UK instruments. Final verification of the US instrument's calibration will be performed using the preliminary data base.		
(U) \$300	Distributed Mission Training (DMT) Technologies (AFRL/Canada) - Cooperative project to develop DMT technologies that will enhance allied simulator based training of US and Canadian fighter aircrews and demonstrate proof of concept. DMT refers to shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. In FY 00 the project will initiate efforts to convert and rehost CF-18 software to multi-task trainer format, and conduct visual perception and engineering research efforts to specify design requirements for ultra-high resolution visuals for DMT flight simulators.		
(U) \$200	Scintillation Impacts on Communication and Navigation Systems (AFRL/Australia) - Cooperative project will exchange data, deploy current sensors, develop improved sensors, and tailor current decision aids, including software, which relate to ionospheric phenomena and their effect on C3I systems. This project will provide the US critical access to data in regions of strategic interest in South East Asia and the South Pacific where large ionospheric disturbances routinely occur. FY 00 activities include the deployment of 1-2 sensors for monitoring scintillation on UHF Satellite Communication links at existing Australian sites. Real-time data retrieval will be implemented at these sites for ready data access and prototype operational support. Routine data collection will be initiated.		
(U) \$4,222	Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay (AFRL/Australia) - This project will validate store separation simulation codes for the release of miniature munitions from internal weapons bays at both subsonic and supersonic airspeeds. The validated trajectory simulation codes will support the store certification efforts for aircraft such as the F-22, Joint Strike Fighter, and Unmanned Combat Air Vehicles. The Royal Australian Air Force (RAAF) F-111G is the only available operational fighter/bomber, with an internal bay, capable of dropping internally carried munitions at subsonic and supersonic velocities.		
	Total		

Project 64NATO

Page 6 of 22 Pages

Exhibit R-2 (PE 0603790F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	64NATO	
(U) A. Mission Description Continued			
(U) FY 2001 (\$ in Thousands)			
(U) \$200	Effects of the Ionosphere on C3I Systems (AFRL/UK) - Cooperative project to leverage complementary ionospheric sensors and data to develop capabilities for timely warning of ionospheric disturbances that disrupt C3I systems. In FY 01, a new sensing technique employing HF ionosounding data to provide (advanced) forecasts of ionospheric disturbance conditions that will affect C3I systems and operations will be demonstrated; and UK oblique High Frequency propagation data and ionospheric total-electron-content (tomography) data will be used to validate the Space Weather concept for real-time specification of the in-theater battlespace environment affecting C3I systems and operations.		
(U) \$400	ITAC Program (AFRL/France) - Cooperative project to develop, integrate and demonstrate critical flight control and flight management technologies that enable cooperative flight operations of a package comprised of UCAVs. The cooperative control architecture enables management and control of an integrated strike package by the aircrews in the combat aircraft. In FY 01 agent integration and development refinement will continue culminating in a real-time simulation. The man-in-the-loop evaluation & demonstration phase will begin in FY 01.		
(U) \$300	Anthropometric Accommodations in Crew Systems (AFRL/The Netherlands) - Cooperative project to establish (a) a collection of three-dimensional (3-D) anthropometric data which accurately and consistently describes the variability of men and women in both Europe and the US; (b) high quality methods for accommodation and interoperability assessment of crew systems; and (c) methods for combining the database with the assessment methods to assure accommodation and interoperability is achieved in the design process. In FY 01 the project will finish the European data collection, and perform accommodations effects assessments using the European data.		
(U) \$351	Air C3I Capabilities (ESC/NATO C3 Agency) - Cooperative project to develop an operationally robust interface between the US CTAPS/TBMCS and NATO Initial CAOC ICC and the future NATO ACCS. This cooperative R&D effort will support air campaign planning and execution for joint and combined air operations. In FY 01 work will entail: 1. producing the C2 interface between fielded systems; 2. harmonization of system data base structures as part of the shared data environment; and 3. evaluating and implementing the reuse of appropriate functional modules.		
(U) \$500	CC3DE (AFRL/Australia, Canada) - Cooperative project to improve the efficiency of future coalition operations capabilities through the development of interoperable C3. This project will initially explore the effective management of information system resources in a coalition environment. It will develop a management architecture for the coalition environment, and develop the tools to implement this architecture. In particular, Asynchronous Transfer Mode (ATM) technology will be integrated into a Broadband-Integrated Services Digital network (B-ISDN) in efforts to form a common international standard for networking. In FY 01 the project will integrate management functionality being developed by individual nations into a CNM demonstrator and conduct experiments accordingly.		
(U) \$850	ATLANTIC PAW (AFRL/France, Germany, UK) - Cooperative project to develop a common waveform syntax allowing for joint allied communications that will be demonstrated on programmable radio systems in each of the participating nations. The waveform interpreter design will be completed in addition to the initial specifications of the waveform language. The development of both of these subsystems will		
Project 64NATO		Page 7 of 22 Pages	
		Exhibit R-2 (PE 0603790F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	64NATO	
(U) A. Mission Description Continued			
(U) FY 2001 (\$ in Thousands) Continued			
(U) \$658	commence jointly in each country and this will include software cost and support integration into the various host nations systems. Preliminary testing of portions of the system components will be performed to mitigate integration risks.		
(U) \$200	Observations and Modeling for Space Weather (AFRL/Germany) - Cooperative project to forecast the global ionosphere and satellite drag using US and German satellite sensors and experiments to provide coordinated observations of solar impact on the space environment. In FY 01 the project will make improvements in the use of currently available sensor data to drive models of the space environment; support on-orbit operations of and analyze data from Ionospheric Occultation eXperiment (IOX); and validate algorithms intended for future use with ultraviolet operational sensor data from the Defense Meteorological Satellite Program (DMSP).		
(U) \$500	Space Radiation Sensors (AFRL/UK) - Cooperative project to validate the performance of a key Air Force spacecraft instrument for the measurement of space environment radiation hazards. The instrument's capability of issuing real-time space hazard warnings will be tested under a variety of conditions encountered in space abroad a joint US/UK satellite mission. In FY 01 the project will begin the development of the final radiation database. The database will be completed in FY 02.		
(U) \$200	DMT Technologies (AFRL/Canada) - Cooperative project to develop DMT technologies that will enhance allied simulator based training of US and Canadian fighter aircrews and demonstrate proof of concept. DMT refers to a shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. In FY 01 the project will complete software conversion and rehost efforts, develop a DMT control station, initiate modernization enhancements and aircraft hardware/emulation integration to the CF-18 Multi-Task Training, and continue visual research and development activities.		
(U) \$400	Refraction and Propagation Modeling for Microwave Systems (AFRL/Australia, UK) - Cooperative project to combine a low cost refraction measurement capability and parabolic equation methods of microwave propagation modeling for evaluating refraction conditions that result in adverse performance of surveillance, communication, signal and directed energy microwave and infra-red systems.		
(U) \$400	Engine Component Life Extension (AFRL/Australia) - Cooperative project to develop life extension techniques and strategies that can be applied to advanced military engines. The engines involved include the US Air Force F100, -220 and -229 and F101 and Australia's TF30, F404 and T700. Much of the technology will be generic and flow from one engine to another.		
(U) \$400	Effects of Ionization on Hydrocarbon Combustion (AFRL/UK) - Cooperative project to investigate the effects of weak ionization on hydrocarbon-air mixture reaction time, and develop promising pilots/flameholders, including plasma ignitors which can be incorporated into scramjet engines. The research will investigate techniques to decrease the time for fuel ignition, and increase the rate of combustion to facilitate high speed propulsion. Other generic requirements to be addressed include extending the altitude range for airbreathing propulsion and providing physically smaller combustors to reduce the associated weight and cooling penalties. In FY 01 the project will complete fundamental reaction rate measurements in fast flow tube experiments, design plasma generators for burner experiments, and begin to update and improve		
Project 64NATO		Page 8 of 22 Pages	
		Exhibit R-2 (PE 0603790F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	February 2000	64NATO
(U) A. Mission Description Continued			
(U) FY 2001 (\$ in Thousands) Continued			
(U) \$250	computational predictive and design tools.		
(U) \$300	<p>Distributed Mission Training (DMT) and Virtual Air Environment (VAE) Technologies (AFRL/Australia) - Cooperative project to develop DMT and VAE technologies that will enhance allied simulator based training of US and Australian fighter aircrews and demonstrate proof of concept.</p> <p>In FY 01 the project will initiate efforts to convert and rehost Australian F-18 software to multi-task trainer format, continue visual perception and engineering research efforts to specify design requirements for ultra-high resolution visuals for DMT flight simulators, and continue long-haul networking and constructive forces development activities.</p> <p>Scintillation Impacts on Communication and Navigation Systems (AFRL/Australia) - Cooperative project will exchange data, deploy current sensors, develop improved sensors, and tailor current decision aids, including software, which relate to ionospheric phenomena and their effect on C3I systems. This project will provide the US critical access to data in regions of strategic interest in South East Asia and the South Pacific where large ionospheric disturbances routinely occur. In FY 01 data collection will continue and 1-2 additional sites will be brought on-line; characterization of ionospheric disturbances in the region and assessment of their impacts on space-based navigation, communications and surveillance systems will be conducted. An intensive multiple-diagnostic measurement campaign will be performed during active scintillation periods to enhance our understanding of the physical mechanisms leading to the development of severe equatorial disturbances.</p>		
(U) \$5,509	Total		
(U) B. Budget Activity Justification			
This PE is designated in Budget Activity 4 because most of the ICRD&A projects support specific systems, include all efforts necessary to evaluate integrated			
(U) C. Program Change Summary (\$ in Thousands)	FY 1999	FY 2000	FY 2001
(U) Previous President's Budget (FY 2000 PBR)	4,105	4,283	5,558
(U) Appropriated Value	4,117	4,283	
(U) Adjustments to Appropriated Value			
a. Congressional/General Reductions	-12		
b. Small Business Innovative Research	-127		
c. Omnibus or Other Above Threshold Reprogram		-34	
d. Below Threshold Reprogram			
e. Rescissions	-22		
f. Other		-27	
			Total Cost
			21,257
Project 64NATO		Exhibit R-2 (PE 0603790F)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

04 - Demonstration and Validation

0603790F NATO Cooperative R&D

PROJECT

64NATO

(U) C. Program Change Summary (\$ in Thousands) Continued

(U) Adjustments to Budget Years Since FY 2000 PBR

(U) Current Budget Submit/FY 2001 PBR

(U) Significant Program Changes:

Change Summary Explanation: N/A

(U) **D. Other Program Funding Summary (\$ in Thousands)**

	FY 1999	Actual
Operating Expenses:		
Salaries and benefits	\$10,768,000	\$10,768,000
Pension contributions	1,000,000	1,000,000
Medical insurance	1,000,000	1,000,000
Dental insurance	1,000,000	1,000,000
Vision insurance	1,000,000	1,000,000
Life insurance	1,000,000	1,000,000
Health savings account	1,000,000	1,000,000
Retirement plan	1,000,000	1,000,000
Other employee benefits	1,000,000	1,000,000
Total Operating Expenses	\$18,768,000	\$18,768,000
Capital Expenditures:		
Equipment	\$1,000,000	\$1,000,000
Construction	1,000,000	1,000,000
Total Capital Expenditures	\$2,000,000	\$2,000,000
Total Available Funds	\$20,768,000	\$20,768,000

<u>FY 2001</u>	<u>Estimate</u>
----------------	-----------------

FY 2002
EstimateFY 2003
EstimateFY 2004
EstimateFY 2005
EstimateFY 2001FY 2001

5,509

5,509

Total Cost

21,257

(U) N/A

(U) Related RDT&E:

(U) This program element provides ICRD&A funds for USAF Laboratory 6.1 through 6.3 programs and USAF Product, Test, and Logistics Center 6.4 through 6.5 programs. Management support for Air Force NATO Cooperative R&D PE 0603790F is funded in Air Force International Activities PE 1001004F at the level of \$300 per fiscal year.

(U) E. Acquisition Strategy

The A principal goal of the NATO Cooperative R&D program is to effectively utilize the aggregate resources invested by the US and our allies in conventional defense R&D. This program element provides the critical funding incentive needed to pursue ICRD&A agreements and helps to (a) leverage USAF and allied resources through cost sharing and economies of scale; (b) exploit the best US and allied technologies for equipping coalition forces; (c) demonstrate areas of commonality or interoperability with our allies; and (d) accelerate the availability of defense technology and systems. Candidate projects are reviewed and approved by the USD(A&T). An international agreement defining project objectives, responsibilities and costs is required prior to release of funds. To obtain these funds and ensure service commitment, projects are selected from existing or new RDT&E programs funded in the Future Years Defense Plan (FYDP). Project offices must show matching funds and contributions from associated program elements and equitable allied funding. As appropriate, funding responsibility for out-year requirements and follow-on efforts are transferred to the project office and associated program elements. Most contracts are awarded after full and open competition.

F. Schedule Profile

FY 1999FY 2000FY 2001

Project 64NATO

Page 10 of 22 Pages

Exhibit R-2 (PE 0603790F)

492

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT					
04 - Demonstration and Validation		0603790F NATO Cooperative R&D						64NATO					
		FY 1999				FY 2000				FY 2001			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	<u>F. Schedule Profile Continued</u>	*			*								
(U)	Effects of the Ionosphere on C3I Systems Project												
(U)	Couple ray-trace/ionospheric model												
(U)	Assemble ground-based SWS				*								
(U)	Expand C3I outage alert coverage to include South Pacific sector												
(U)	SWS data acquisition campaign in UK								X				
(U)	Develop HF sounding technique to forecast scintillation conditions									X			
(U)	Field demonstration of HF scintillation forecasting techniques										X		
(U)	Employ UK sensor data to validate/expand SWS C3I support concept												
(U)	DMCPW Project												X
(U)	Preliminary design		*										
(U)	Detailed design, development, and ground testing					X	X						
(U)	System analyses and material tests			*			X						
(U)	Cooperative R&D Efforts in Imaging Spectrometer Development Project				*								
(U)	Preliminary design												
(U)	Concept checkout												
(U)	Brassboard Development & Checkout					X		X					
(U)	Instrument Design									X			
(U)	Lab Instrument Fabrication & Checkout												
(U)	Instrument Ruggedization												
(U)	Field Demonstration												
(U)	MMCs for Aerospace Application Project				*								
(U)	Concept definition												
(U)	Produce and evaluate MMCs						X					X	
(U)	Specify improved MMCs												
(U)	Produce and evaluate improved MMC												X
(U)	FPST/HEG Project												
(U)	Calibration, fabrication of models, testing	*											
Project 64NATO													
Page 11 of 22 Pages													
Exhibit R-2 (PE 0603790F)													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

Page 12 of 22 Pages

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE							
04 - Demonstration and Validation	0603790F NATO Cooperative R&D						February 2000	
	FY 1999			FY 2000			FY 2001	
	1	2	3	4	1	2	3	
(U) F. Schedule Profile Continued								
(U) ITAC Project								
(U) System definition	*		*					
(U) System design			*					
(U) Detailed design			*	X				
(U) System mechanization				X				
(U) Simulation and Evaluation				X		X		
(U) DMT Technologies Project								
(U) Agreement signed					X			
(U) Program start								
(U) CF-18 software conversion						X		
(U) Software rehost						X		
(U) Instructor operator control station								
(U) CF-18 modernization enhancements						X		
(U) Aircraft hardware/emulation integration						X		
(U) Visual research								
(U) Anthropometric Accommodation in Crew Systems Project								
(U) Conduct anthropometric survey	*							
(U) Assess subjects in actual cockpits	*	*				X		
(U) Assess one model in the US and one model in The Netherlands			*					
(U) Augmented reality assessments			*					
(U) 3-D data reduction						X		
(U) Compare live subject, computer model, and augmented reality results					X			
(U) Comparison of data from The Netherlands with the US						X		
(U) Structural Integrity of Aging Aircraft Project								
(U) Develop widespread fatigue damage analytical models						X		
(U) Develop corrosion/fatigue analysis techniques			*					
(U) Evaluate composite patch analysis techniques for metallic structures			*	X		X		
(U) Identify candidate solutions for dynamic control			*	X				

Page 13 of 22 Pages
 Exhibit R-2 (PE 0603790F)
 Project 64NATO

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 2000		PROJECT			
BUDGET ACTIVITY										PE NUMBER AND TITLE						64NATO	
04 - Demonstration and Validation										0603790F NATO Cooperative R&D							
F. Schedule Profile Continued										FY 1999		FY 2000		FY 2001			
										1	2	3	4	1	2	3	4
(U)	Identify fatigue life enhancement techniques																
(U)	Airworthiness of Aging Aircraft Project																
(U)	Develop life enhancement analysis techniques													X	X		
(U)	Conduct experiments													X	X		
(U)	Document corrosion/fatigue service																
(U)	Aging Aircraft Life Prediction/ Extension Project																
(U)	Coordinate with US											*					
(U)	Develop corrosion/fatigue analysis techniques																
(U)	Evaluate composite patch analysis techniques for metallic structures													X			
(U)	Prepare for flight tests																
(U)	Advanced Hybrid Propulsion Technologies Cooperative Research Project																
(U)	Detail design									*							
(U)	Oxidizer expulsion system										*						
(U)	Controls											*					
(U)	Injector																
(U)	Pressurization system													X			
(U)	Oxidizer development																
(U)	Integrate subsystems																
(U)	Determine suitability for integrated testing									*				X			
(U)	Conduct integrated testing													X			
(U)	Data analysis and reporting																
(U)	ACES II - Ejection Seat Cooperative Modification Project																
(U)	Detailed design									*							
(U)	Complete design																
(U)	Complete joint sled testing																
(U)	Complete USAF OT&E																
(U)	Space Radiation Sensors Project																
Project 64NATO										Exhibit R-2 (PE 0603790F)							
Page 14 of 22 Pages																	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		PROJECT					
BUDGET ACTIVITY		PE NUMBER AND TITLE															
04 - Demonstration and Validation		0603790F NATO Cooperative R&D												February 2000		64NATO	
		FY 1999				FY 2000				FY 2001							
		1	2	3	4	1	2	3	4	1	2	3	4				
(U)	<u>F. Schedule Profile Continued</u>																
(U)	Agreement signed																
(U)	Calibration review																
(U)	Preliminary data base																
(U)	Verification of calibration																
(U)	Final unified data base																
(U)	Air C3I Capabilities Project																
(U)	Agreement Signed																
(U)	Draft program and implementation plan																
(U)	Contract change request released					X											
(U)	Issue technical task descriptive						X										
(U)	Program definition																
(U)	Scope work effort to achieve shared data environment								X								
(U)	Develop translator extensions									X							
(U)	US/NATO Battle Lab verification and development test									X							
(U)	Examine US/NATO Concept of Operations									X							
(U)	CC3DE Project																
(U)	Agreement Signed																
(U)	Testbed Setup & Evaluation									X							
(U)	Network management integration									X							
(U)	C3I application & integration demonstration																
(U)	ATLANTIC PAW Project																
(U)	Radio development																
(U)	Compliance testing																
(U)	Agreement Review/mods signed									X							
(U)	Tool characterization																
(U)	Interpreter characterization/design																
(U)	Allied waveform coding																
(U)	Observations and Modeling for Space Weather Project												X				
Project 64NATO														Exhibit R-2 (PE 0603790F)			

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE	February 2000	PROJECT		
BUDGET ACTIVITY		PE NUMBER AND TITLE			64NATO				
04 - Demonstration and Validation		0603790F NATO Cooperative R&D							
		FY 1999			FY 2000				
		1	2	3	4	1	2	3	4
(U) F. Schedule Profile Continued									
(U) Agreement signed									
(U) Exchange existing data									
(U) Analyze existing data									
(U) Test and upgrade models									
(U) Support on-orbit operations of IOX									
(U) Analysis on satellite data									
(U) Scintillation Impacts on Communication and Navigation Systems Project									
(U) Agreement Signed									
(U) Implement real-time data collection at existing sites									
(U) Deploy scintillation monitors									
(U) Correlate and calibrate data sets									
(U) Characterize local disturbance climatology									
(U) Campaign/complete data collection									
(U) Develop regional forecast algorithms									
(U) Report on regional scintillation and tailored products for C3I systems									
(U) Refraction and Propagation Modeling for Microwave Systems Project									
(U) Test parabolic propagation model with real refraction data									
(U) Aircraft measurements: validate extreme refraction cases									
(U) Aircraft data reduction and analyses									
(U) Validation propagation model for extreme cases									
(U) Demonstrate model use with AWACS operation									
(U) Final report									
(U) Engine Component Life Extension Project									
(U) Agreement signed									
(U) Engine Rotor Life Extension (ERLE) technical/economic studies									
(U) Advance life prediction methodologies for ERLE									
(U) Advanced Nondestructive Inspection/Evaluation technology									
Project 64NATO									
Page 16 of 22 Pages									
Exhibit R-2 (PE 0603790F)									

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February 2000

PE NUMBER AND TITLE

0603790F NATO Cooperative R&D

64NATO

(U)	E. Schedule Profile Continued
	FY 1999 1 2 3 4 1 2 3 4
	FY 2000 2 3 4 1 2 3 4
	FY 2001 2 3 4 1 2 3 4
(U)	development
(U)	Advance manufacture concepts/technical development for ERLE
(U)	Flight Test Demo of Mini Munitions Release From Internal Weapons Bay
(U)	Agreement signed
(U)	Logistics preparations
(U)	Weapons hardware integration
(U)	Operational hardware installation
(U)	Flight test
(U)	Final Reporting
(U)	DMT & VAE Technologies Project
(U)	Agreement signed
(U)	Program start
(U)	F-18 Software Conversion
(U)	Software rehost
(U)	Visual research
(U)	Multiship network/cooperative forces/coalition DMT R&D

Page 17 of 22 Pages

Exhibit R-2 (PE 0603790F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	64NATO		
(U) A. Project Cost Breakdown (\$ in Thousands)		FY 1999	FY 2000	FY 2001
(U) Effects of the Ionosphere on C3I Systems		195	213	200
(U) FPST/HEG Project		106	100	0
(U) DMCPW		1,000	0	0
(U) Cooperative Research and Development Efforts in Imaging Spectrometer Development		250	0	0
(U) MMCs for Aerospace Applications		100	0	0
(U) Geoscience Space Mission/Cooperative Space Measurements		0	75	0
(U) Project Refractive Turbulence		105	0	0
(U) Advanced Combustor Chamber Concepts Program		0	334	0
(U) ITAC Program		200	600	400
(U) Anthropometric Accommodation in Crew Systems		300	300	300
(U) Aging Aircraft Life Prediction/Extension		0	400	0
(U) Structural Integrity of Aging Aircraft		0	350	0
(U) Airworthiness of Aging Aircraft		0	250	0
(U) Advanced Hybrid Propulsion Technologies Cooperative Research Project		700	0	0
(U) ACES II - Ejection Seat Cooperative Modification Project		1,000	0	0
(U) Air C3I Capabilities		0	250	351
(U) CC3DE		0	250	500
(U) ATLANTIC PAW		0	250	850
(U) Observations and Modeling for Space Weather		0	0	658
(U) Space Radiation Sensors		0	100	200
(U) DMT Technologies		0	250	500
(U) Refraction and Propagation Modeling for Microwave Systems		0	0	200
(U) Engine Component Life Extension		0	0	400
(U) Effects of Ionization on Hydrocarbon-Air Combustion		0	0	400
(U) Scintillation Impacts on Communication and Navigation Systems		0	300	300
(U) DMT and VAE Technologies		0	0	250
(U) Flight Test Demonstration of Miniature Munitions Release from Internal Bay		0	200	0
(U) Total		3,956	4,222	5,509
Complete information regarding the use of NATO Cooperative R&D funds is not available for all proposed agreements, since some are still being negotiated or were				
Project 64NATO			Exhibit R-3 (PE 0603790F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY										PROJECT	
04 - Demonstration and Validation										64NATO	
PE NUMBER AND TITLE										0603790F NATO Cooperative R&D	
(U) A. Project Cost Breakdown (\$ in Thousands) Continued										FY 1999	FY 2000
recently signed. In addition, information on the use of future funding for continuing agreements is not available in all instances because the funds are used as needed to supplement a project office's related 6.1 through 6.5 RDT&E appropriations.										FY 2001	FY 2001
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
(U) Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program	
Product Development Organizations											
Lockheed Martin Colorado Springs, CO	CPAF	Oct 95			0	0	250	301		551	
Sytronics Dayton, OH	CPFF	Apr 98			600	300	300	300		1,500	
Boston College Boston, MA	CFSR	Mar 97			155	0	0	0		155	
RADEX Bedford, MA	CPFF	Mar 97			385	75	55	50		565	
Pacific Sierra Research Santa Monica, CA	CPFF	Mar 97			60	0	0	0		60	
CPI Fairfax, VA	CPFF	Mar 97			160	20	20	20		220	
U of Massachusetts Lowell, MA	CR	Apr 97			120	50	50	50		270	
KEO Consultants Brookline, MA	CPFF	Mar 97			220	0	25	20		265	
NW Research Associates Bellevue, WA	CPFF	Apr 97			80	0	50	50		180	
U of Texas Austin, TX	CPFF	May 97			25	0	0	0		25	
Applied Research Lab, U of Texas Austin, TX	CPFF	May 97			80	25	0	0		105	
Lockheed Martin Orlando, FL	CPFF	Sep 96			913	535	0	0		1,448	
Raytheon TI Systems	CPFF	Dec 97			683	0	0	0		683	
Project 64NATO										Exhibit R-3 (PE 0603790F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
04 - Demonstration and Validation		0603790F NATO Cooperative R&D			64NATO
(U) Performing Organizations Continued:					
Product Development Organizations					
Boeing Seattle, WA	CPFF	Sep 98	260	200	500
UES, Inc Dayton, OH	CPFF	Oct 97	100	100	0
NOAA/ATDD Oak Ridge, TN	MIPR	Oct 97	0	80	0
Pratt & Whitney West Palm Beach, FL	CPFF	Jun 98	1,000	0	334
AFRL WPAFB, OH	TBD	TBD	0	0	0
Boeing Long Beach, CA	CPFF	Jul 98	265	0	0
Boeing Seattle, WA	CPFF	Mar 98	200	0	0
Lockheed Marietta, GA	CPFF	Oct 98	325	0	200
Northrop Hawthorne, CA	CPFF	Oct 98	50	0	0
Selectech Dayton, OH	CPFF	Feb 98	50	0	300
Boeing St Louis, MO	CPFF	Mar 00	0	0	250
University of South Carolina	CPFF	Apr 00	0	0	250
Boeing St Louis, MO	CPIF	Apr 99	0	1,000	0
Thiokol Corp Elkton, MD	CPFF	Nov 97	0	700	0
Raytheon Mesa, AZ	CPFF	Jul 97	0	0	0
CPI Annandale, VA	CPFF	TBD	0	0	250
U of Colorado Boulder, CO	CPFF	TBD	0	0	0
Boston College Newton, MA	CPFF	TBD	0	0	100
Radex	CPFF	Feb 01	0	0	50
Applied Physics Lab Laurel, MD	MIPR	May 00	0	0	150
Boston College Boston, MA	CPFF	TBD	0	0	158
Radex Bedford, MA	CPFF	TBD	0	0	40
U of Mass Lowell, MA	CR	TBD	0	0	90
Scion Associates Seattle, WA	CPFF	TBD	0	0	45
SRI, Int'l Menlo Park, CA	CPFF	TBD	0	0	60
AFRL Rome, NY	TBD	TBD	0	0	65
					40
					500
					1,350
					1,850

Project 64NATO

Page 20 of 22 Pages

Exhibit R-3 (PE 0603790F)

Page 20 of 22 Pages

502

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
04 - Demonstration and Validation		0603790F NATO Cooperative R&D			64NATO
(U) Performing Organizations Continued:					
Product Development Organizations					
AFRL Hanscom, MA	TBD	0	0	100	400
Support and Management Organizations					
AFRL Hanscom, MA		110	50	113	80
AFRL WPAFB, OH		5	0	20	400
45th Space Wing Patrick AFB, FL	AF 185 May 95	5	0	0	0
AFRL Eglin AFB, FL		50	17	0	0
Pender Technology, TN	CR Oct 97	45	45	0	0
Veridian Dayton, OH		145	0	80	40
Test and Evaluation Organizations					
Air Force Development Test Center, FL	PO Jan 98	54	448	0	0
Sverdrup Technology, Inc TN CPAF	Sep 95	1,238	311	100	0
Naval Air Warfare CenterPoint Mugu, CA	MIPR Jan 99	40	0	0	0
Arnold Engineering Development Center, TN	TBD	0	0	200	0
*Not applicable. NATO Cooperative R&D funds supplement as needed a project office's 6.1 through 6.5 RDT&E appropriations for initiating international cooperative R&D agreements and exploiting favorable program and technological opportunities with major allied partners.					
(U) Government Furnished Property:					
Contract					
Item	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999
Description				Budget FY 2000	Budget to Complete
Product Development Property					Total Program
None					
Support and Management Property					
None					
Project 64NATO					
Page 21 of 22 Pages					
Exhibit R-3 (PE 0603790F)					

503

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE	PROJECT				
04 - Demonstration and Validation		0603790F NATO Cooperative R&D		February 2000	64NATO				
(U)	<u>Government Furnished Property Continued:</u>								
	Test and Evaluation Property								
	Fora laser system	PO	Nov 97	Jan 98					
	Subtotals								
	Subtotal Product Development				147	0	0	0	147
	Subtotal Support and Management				Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete	Total Program
	Subtotal Test and Evaluation				5,731	3,085	3,709	4,989	17,514
	Total Project				360	112	213	520	1,205
					1,479	759	300	0	2,538
					7,570	3,956	4,222	5,509	21,257

Project 64NATO

Page 22 of 22 Pages

Exhibit R-3 (PE 0603790F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE									PROJECT
04 - Demonstration and Validation		0603800F Joint Strike Fighter									642025
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
642025	Joint Strike Fighter (JSF)	453,600	249,088	129,538	0	0	0	0	0	1,695,723	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	
(U) A. Mission Description											
The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike fighter aircraft for the USN, USMC, USAF and allies. Current program emphasis is on facilitating the evolution of fully validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (EMD) in FY 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program. The United Kingdom (UK) is a collaborative partner in this phase of the program and several other countries also participate.											
'FY 1999 ACTUAL' UNDERSTATED BY \$2.537M. BTR NOT REFLECTED IN ABIDES DATABASE. COST BREAKOUT BELOW REFLECTS CORRECT PROGRAM AMOUNTS.											
PROGRAM FUNDING BREAKOUT (FY1999, 2000, 2001) REFLECTS NAVY, AIR FORCE, MULTI-LATERAL (NETHERLANDS, NORWAY, & DENMARK), CANADA, AND ITALY (FY99 ONLY).											
(U)	FY 1999 (\$ in Thousands)										
(U)	\$762,415	Continued Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including company unique technology demonstrations, completed final design and continued build of Concept Demonstrator Aircraft (CDA) and continued concept refinement for a tri-service family of aircraft.									
(U)	\$40,153	Continued the Alternate Engine Program.									
(U)	\$141,580	Continued technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion and mission systems. Completed approximately half of the demonstrations. Continued systems engineering support for the Concept Demonstration Phase (CDP) in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.									
(U)	\$9,341	Continued technology maturation demonstrations and assessments in the area of Prognostics and Health Management, supportability and training.									
(U)	\$13,307	Continued modeling and simulation activities to support strike warfare mission area analysis and requirements analysis efforts including COPT									
Project 642025		Page 1 of 12 Pages									Exhibit R-2 (PE 0603800F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603800F Joint Strike Fighter	642025	
(U) A. Mission Description Continued			
(U) FY 1999 (\$ in Thousands) Continued	to facilitate the Services' joint requirements definition. Continued requirements analysis in support of final requirements document. Continued modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).		
(U) \$15,227	Continued mission support, including program office functions.		
(U) \$982,023	Total		
(U) FY 2000 (\$ in Thousands)			
(U) \$394,892	Continue Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation, and concept refinement for a tri-service family of aircraft. Request proposals from contractors for their designs and EMD programs.		
(U) \$26,190	Continue the Alternate Engine Program.		
(U) \$68,554	Continue technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion and mission systems. Continue systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control, and carrier suitability.		
(U) \$8,853	Continue technology maturation demonstrations and assessments in the area autonomic logistics (formerly supportability and training).		
(U) \$9,030	Complete Prognostics and Health Management technology maturation demonstrations and assessments.		
	Continue modeling and simulation activities to support strike warfare mission area analysis and requirements analysis efforts including COPT to facilitate the Services' joint requirements definition. Support analysis as required for final Operational Requirements Document (ORD)		
	coordination and signature. Continue modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).		
(U) \$15,377	Continue mission support, including program office functions.		
(U) \$522,896	Total		
(U) FY 2001 (\$ in Thousands)			
(U) \$110,552	Complete Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation and concept refinement for a tri-service family of aircraft.		
(U) \$94,000	Complete the Alternate Engine Phase IIIA effort (Common Core Design Trade Studies) in this Program Element. (Alternate Engine Development Program will continue in JSF EMD, Program Elements 0604800N and 0604800F.)		
(U) \$38,137	Complete technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility,		
Project 642025		Page 2 of 12 Pages	
		Exhibit R-2 (PE 0603800F)	

506

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation		0603800F Joint Strike Fighter	642025	
(U)	<u>A. Mission Description Continued</u>			
(U)	<u>FY 2001 (\$ in Thousands) Continued</u>			
	mission systems, propulsion and autonomic logistics. Complete systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability. Complete analyses required for Milestone II. Commence and complete source selection evaluation to down-select for final design. Complete modeling and simulation activities to support Milestone II analyses. Complete modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).			
(U)	\$5,000			
(U)	\$15,715			
(U)	\$263,404			
(U)	<u>B. Budget Activity Justification</u>			
	This program is funded under Program Definition and Risk Reduction (PDRR), formerly Demonstration and Validation (DEM/VAL), because it integrates hardware for test related to specific ship or aircraft applications.			
(U)	<u>C. Program Change Summary (\$ in Thousands)</u>			
(U)	Previous President's Budget (FY 2000 PBR)	FY 1999	FY 2000	FY 2001
(U)	Appropriated Value	454,789	235,374	22,558
(U)	Adjustments to Appropriated Value	456,137	250,374	
	a. Congressional/General Reductions			
	b. Small Business Innovative Research			
	c. Omnibus or Other Above Threshold Reprogram			
	d. Below Threshold Reprogram			
	e. Rescissions	3,825		
	f. Other	-3,825	-1,286	
(U)	Adjustments to Budget Years Since FY 2000 PBR			106,980
(U)	Current Budget Submit/FY 2001 PBR	456,137	249,088	129,538
				122,042
				1,695,723

507

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603800F Joint Strike Fighter								642025	
(U)	<u>C. Program Change Summary (\$ in Thousands) Continued</u>										
(U)	<u>Significant Program Changes:</u> (U) Significant Program Changes: FY99 increase of \$3,825 reflects Below Threshold Reprogramming to mitigate impacts caused by the Economic Assumption Congressional Rescission (\$1,288) and the 'Inflation Savings' Congressional Recession (\$2,537). FY00 decrease of \$1,286 reflects the across the board Congressional Recession. FY00 Appropriated Value increase of \$15M reflects Congressional increase for the alternate engine program. FY01 increase reflects a Zero Base Transfer from PE0604800F of \$107 million to cover alternate engine program and CDP requirements and a program adjustment decrease of \$20.										
(U)	<u>D. Other Program Funding Summary (\$ in Thousands)</u>										
		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost	
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete		
(U)	RDT&E 0603800N	471,290	239,907	131,566	0	0	0	0	0	1,742,506	
(U)	RDT&E 0603800E	0	0	0	0	0	0	0	0	118,006	
(U)	United Kingdom	34,096	26,101	0	0	0	0	0	0	200,291	
(U)	Multi-Lateral (see Note1)	7,500	5,100	1,700	0	0	0	0	0	32,100	
(U)	Canada	3,000	2,700	600	0	0	0	0	0	10,600	
(U)	Italy	10,000								10,000	
(U)	RDT&E 0604800F	0	0	299,540	1,321,726	1,927,241	1,853,319	1,631,937	Continuing	TBD	
(U)	RDT&E 0604800N	0	0	295,962	1,324,048	1,932,487	1,859,938	1,639,111	Continuing	TBD	
(U)	Related Procurement										
	Funding:										
(U)	Procurement 0207142F - JSF Squadrons	0	0	0	0	0	18,000	587,308	Continuing	TBD	
(U)	Procurement 0204800N - JSF Squadrons	0	0	0	0	0	0	57,735	Continuing	TBD	
	Note 1: Multi-Lateral countries include Netherlands, Norway, and Denmark.										
	Note 2: This is a joint program with no executive service. The UK is a collaborative partner in this phase of the program. Several other countries participate.										
	Note 3: Milestone II for EMD of the JSF is planned in FY 2001.										
	Note 4: RDT&E 0604800 depicted funding excludes anticipated foreign funding which is TBD.										
	Note 5: December 1998 Selected Acquisition Report (SAR) reflected total EMD cost estimate of \$19.8B (\$TY) funded by the USN, USAF, and anticipated (but not finalized) foreign sources.										
	Note 6: Advanced procurement for JSF is planned in FY 2004.										
Project 642025		Page 4 of 12 Pages								Exhibit R-2 (PE 0603800F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation	0603800F Joint Strike Fighter	642025

(U) **E. Acquisition Strategy**

Program activities center around three distinct objectives that provide a sound foundation for the start of Engineering and Manufacturing Development (EMD) in 2001:

- (1) facilitating the Services' development of fully validated, affordable operational requirements;
- (2) lowering risk by investing in and demonstrating key leveraging technologies that lower the cost of development, production and ownership; and
- (3) demonstrating operational concepts.

Early warfighter and technologist interaction is an essential aspect of the requirements definition process, and key to achieving JSF affordability goals. To an unprecedented degree, the JSF program is using cost-performance trades early, as an integral part of the weapon system development process. The Services are defining requirements through an iterative process, balancing weapon system capability against life cycle cost at every stage. Each iteration of the requirements is provided to industry. They evolve their designs and provide cost data back to the warfighters. The warfighters evaluate trades and make decisions for the next iteration. This process produced the Services' first Joint Initial Requirements Document (JIRD I) in 1995 and the second and third iterations in 1997 and 1998, respectively. The Services continue to refine their requirements through this process which will culminate in the Operational Requirements Document (ORD) in FY 2000 to support the Milestone II decision.

A sizable technology maturation effort is underway to reduce risk and life cycle cost (LCC) through technology maturation and demonstration. The primary emphasis is on technologies which have been identified as high payoff contributors to affordability, supportability, survivability and lethality. Numerous demonstrations have been accomplished and others are in process to validate performance and life cycle cost impact to component, subsystem and the total system.

A multi-year \$2.2 billion JSF Concept Demonstration effort commenced in November 1996 with competitive contract awards to Boeing and Lockheed Martin for Concept Demonstration Programs. These competing contractors will build and fly concept demonstrator aircraft, conduct concept unique ground demonstrations, and continue refinement of their ultimate delivered weapon system concepts. Specifically, Boeing and Lockheed Martin will demonstrate commonality and modularity, Short Take Off/ Vertical Land (STOVL) hover and transition, and low speed handling qualities of their respective weapon system concepts. Pratt and Whitney is providing propulsion hardware and engineering support for both Boeing's and Lockheed Martin's on-going JSF Concept Demonstration efforts. The JSF Concept Demonstration approach has several benefits:

- (1) Maintains the competitive environment prior to EMD and provides for two different STOVL approaches and two different aerodynamic configurations.
- (2) Demonstrates the viability of a multi-service family of variants with high commonality and modularity between CTOL, CV and STOVL variants.
- (3) Provides affordable and low risk technology transition to the JSF EMD phase.

The JSF Alternate Engine Program, with General Electric, continues development of an alternate engine for production.

Downselect to a single prime weapon system contractor for EMD and Milestone II are planned in FY 2001. JSF production is planned to begin in FY 2005.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603800F Joint Strike Fighter								642025	
(U)	<u>F. Schedule Profile</u>										
		1	2	3	4	1	2	3	4		
(U)	Commenced Concept Development Phase: Dec 94										
(U)	Released RFP for Concept Demonstration Efforts: Mar 96										
(U)	Designated a joint, DoD, Acq Category ID Program by USD(A&T): May 96										
(U)	Competitively awarded CDP Contracts to Boeing and Lockheed Martin: Nov 96										
(U)	Complete Operational Requirements Document (ORD) Approval: Mar 00										
(U)	Milestone II for JSF EMD: Mar 01										

Project 642025

Page 6 of 12 Pages

Exhibit R-2 (PE 0603800F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603800F Joint Strike Fighter	642025		
(U) A. Project Cost Breakdown (\$ in Thousands)		FY 1999	FY 2000	FY 2001
(U) PROJECT COST CATEGORIES:				
(U) WEAPON SYSTEMS CONCEPT DEMONSTRATIONS (including flying demonstrators and supporting propulsion efforts)		762,415	394,892	110,552
(U) ALTERNATE ENGINE PROGRAM		40,153	26,190	94,000
(U) TECHNOLOGY MATURATION AREAS:				
(U) Airframe		1,231	1,420	1,500
(U) Flight Systems		32,589	6,668	3,320
(U) Manufacturing and Producibility		3,675	1,233	1,530
(U) Propulsion		24,282	7,245	3,000
(U) Mission Systems		41,675	9,522	9,955
(U) Systems Engineering Support		37,208	41,546	10,468
(U) Prognostics and Health Management/Autonomic Logistics		9,311	8,853	7,444
(U) Modeling, Simulation, Analysis, Threat, COPT and Core Support		12,907	8,630	4,600
(U) Mission Support		5,709	5,972	6,210
(U) SUPPORT (CS)		10,868	10,725	10,825
(U) TEST AND EVALUATION: (included above)				
(U) MANAGEMENT: N/A				
(U) Total		982,023	522,896	263,404
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)				
(U) Performing Organizations:				
Contractor or	Contract			
Government	Method/Type			
Performing	Award or			
Activity	Obligation			
	Date			
	Performing			
	Activity			
	Office			
	EAC			
	Total Prior			
	to FY 1999			
	Budget			
	FY 1999			
	Budget			
	FY 2000			
	Budget to			
	Complete			
	Program			
	Total			

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
04 - Demonstration and Validation		0603800F Joint Strike Fighter			February 2000
(U) Performing Organizations Continued:					
Product Development Organizations					
Strike Warfare Concept					
Studies:					
Miscellaneous	Various	11,467	11,467		11,467
Technology Maturation					
Concept Exploration Phase:					
Filed Activities	Various	3,432	3,432		3,432
Strike Warfare Systems					
Design Development:					
Boeing, Seattle WA	C/CPFF	32,770	32,770		32,770
McAir, St Louis MO	C/CPFF	23,708	23,708		23,708
Northrop, Pico Rivera CA	C/CPFF	21,358	21,358		21,358
Lockheed Martin, Fort Worth TX	C/CPFF	28,311	28,311		28,311
Miscellaneous		1,121	1,121		1,121
Field Activities		8,322	8,322		8,322
ASTOVL:					
Lockheed Martin	SS/CPFF	16,416	16,416		16,416
Boeing	SS/CPFF	11,200	11,200		11,200
Miscellaneous	Various	15,539	15,539		15,539
Core Team Support		2,522	2,522		2,522
Field Activities					
Weapon System Concept Demonstrations(Note 1):					
Boeing	C/CPFF	734,013	734,013	269,627	156,761
				16,269	734,013
Lockheed Martin	C/CPFF	797,559	797,559	280,122	153,931
				14,083	797,559
Pratt & Whitney, WP Beach, FL	SS/CPFF	914,471	914,471	212,666	84,200
				80,200	914,471
Project 642025					

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE					
04 - Demonstration and Validation	0603800F Joint Strike Fighter					642025
(U) Performing Organizations Continued:						
Product Development Organizations						
Alternate Engine Program						
(Note 2):						
General Electric, SS/CPFF	7,000	7,000	7,000			7,000
Cincinnati OH						
General Electric, SS/CPFF	222,137	222,137	61,794	40,153	26,190	222,137
Cincinnati OH						
TECHNOLOGY						
MATURATION AREAS:						
AIRFRAME:						
McAir	19,240	19,240	19,240			19,240
Miscellaneous	2,168	2,168	1,985	94	44	2,168
Field Activities	8,204	8,204	4,236	1,137	1,376	8,204
FLIGHT SYSTEMS:						
Lockheed Martin	52,700	52,700	41,515	9,807	1,378	52,700
McAir	65,821	65,821	46,901	17,920	1,000	65,821
Miscellaneous	10,605	10,605	9,090	650	60	10,605
Field Activities	24,448	24,448	13,491	4,212	4,230	24,448
MANUFACTURING AND						
PRODUCIBILITY:						
Hughes, Los Angeles	5,065	5,065	5,065			5,065
CA						
Lockheed Martin	10,200	10,200	7,500	2,100	600	10,200
General Res.	1,945	1,945	1,945			1,945
Corp., Huntsville AL						
Scaled Composites	2,000	2,000	2,000			2,000
Lockheed Martin	700	700	700			700
Miscellaneous	1,679	1,679	1,343	201	75	1,679
Project 642025						Exhibit R-3 (PE 0603800F)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT			
BUDGET ACTIVITY	PE NUMBER AND TITLE								
04 - Demonstration and Validation	0603800F Joint Strike Fighter					642025			
(U) Performing Organizations Continued:									
<u>Product Development Organizations</u>									
Field Activities	Various	Nov98/99/0 0	6,688	6,688	3,286	1,374	558	1,470	6,688
PROPULSION:									
Pratt & Whitney	C/CPFF		5,448	5,448					5,448
General Electric	SS/CPFF		5,681	5,681					5,681
Pratt & Whitney	SS/CPFF		30,000	30,000					30,000
General Electric	SS/CPFF		3,000	3,000					3,000
Pratt & Whitney	SS/CPFF	Jan99	26,777	26,777					26,777
Pratt & Whitney	SS/CPFF		3,640	3,640					3,640
Pratt & Whitney	SS/TBD	Dec98	8,200	8,200					8,200
NASA Contracts	Various	Jul99	2,800	2,800					2,800
Miscellaneous	Various	Various	14,979	14,979				48	14,797
Field Activities	Various	Nov98/99/0 0	50,020	50,020				7,197	50,020
MISSION SYSTEMS:									
TI, Plano TX	C/CPFF		2,464	2,464					2,464
Lockheed	SS/CPFF		6,856	6,856					6,856
McAir	SS/CPFF		6,524	6,524					6,524
Raytheon	C/CPFF	Nov98/99	45,173	45,173				0	45,173
Northrop Grumman	C/CPFF	Nov98/99	41,903	41,903				0	41,903
Boeing	C/CPFF		1,575	1,575					1,575
Lockheed Martin	C/CPFF		1,517	1,517					1,517
Hughes	C/CPFF		3,681	3,681					3,681
Classified	Classified	Nov98	3,000	3,000					3,000
Miscellaneous	Various	Various	26,092	26,092				2,139	26,092
Field Activities	Various	Nov98/99/0 0	42,584	42,584				7,383	42,584
SYSTEMS									
ENGINEERING SUPPORT:									

Page 10 of 12 Pages

Exhibit R-3 (PE 0603800F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT	
04 - Demonstration and Validation		0603800F Joint Strike Fighter				642025	
(U) Performing Organizations Continued:							
Product Development Organizations							
Miscellaneous	Various	33,706	33,706	11,993	8,573	10,011	3,129
Field Activities	Various	132,478	132,478	64,969	28,635	31,535	7,339
	0						
PROGNOSTICS AND HEALTH MANAGEMENT							
/AUTONOMIC LOGISTICS:							
Pratt & Whitney	C/CPFF	10,100	10,100	10,100			10,100
General Electric	C/CPFF	1,500	1,500		1,500		1,500
Classified	C/CPFF						
Project 3	C/CPFF	8,576	8,576	7,826	750		8,576
Project 4	C/CPFF	5,549	5,549	4,799	750		5,549
Miscellaneous	Various	11,330	11,330	2,271	2,281	5,661	1,117
Field Activity	Various	21,226	21,226	7,677	4,030	3,192	6,327
	0						
MODELING, SIMULATION, ANALYSIS, THREAT, COPT, AND CORE SUPPORT:							
Miscellaneous	Various	46,719	46,719	37,719	5,033	3,277	690
Field Activities	Various	36,145	36,145	19,008	7,874	5,353	3,910
	0						
MISSION SUPPORT:							
Institute for Defense Analysis	Grant	2,500	2,500	2,500			2,500
Field Activities	Various	38,524	38,524	20,633	5,709	5,972	6,210

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603850F Integrated Broadcast Service (DEMVAL)								644778	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644778	Integrated Broadcast Service	0	24,198	24,488	17,146	20,258	10,215	10,452	Continuing	TBD	
	Quantity of RDT&E Articles	0	0	0	0	1	1	2	Continuing	TBD	
<p>* FY 1999 IBS funds (Procurement, RDT&E, O&M) are in USN PE0305972N.</p> <p>(U) <u>A. Mission Description</u></p> <p>The Integrated Broadcast Service (IBS) provides warfighters with critical and highly perishable intelligence and information in a single, correlated picture via a near-real-time, integrated dissemination architecture. IBS consolidates existing intelligence broadcast systems into a common-format, common-terminal, theater-tailored architecture. The IBS design incorporates new functionality in broadcast and information management, a new message format, and a new receiver. It fields five fixed and two deployable Information Management Elements (IME) to geographic Commanders-in-Chief (CINC) that perform requirements as set forth in the Joint Operational Requirements Document.</p> <ul style="list-style-type: none"> - Accept data from dissimilar, geographically-dispersed data sources including airborne, space-based, shipborne and ground Signals Intelligence (SIGINT), radar and infrared sensors. - Transmit intelligence and information to end users equipped with Joint Tactical Terminal (JTT) or terminals which incorporate the Common IBS Modules (CIBS-M). - Disseminate theater oriented, based, and focused intelligence and information, based on user generated and CINC validated dissemination priorities. - Disseminate intelligence and information over various communications paths, based on the communications available to the end user. <p>In July 1999, the IBS Executive Integrated Product Team (IPT) (co-chaired by the Deputy Assistant Secretary of Defense/Command, Control, Communications, Intelligence, Surveillance, Reconnaissance & Space and the Chief of Naval Operations/N6B) directed a program restructure, which was a result of a Spiral #1 schedule slip. Spiral #1 problems were due to a misunderstanding of the complexity of IBS requirements. Program re-plan approval expected February 2000.</p> <p>(U) FY 1999 (\$ in Thousands)</p> <p>(U) \$0 No Activity under USAF PE</p> <p>(U) \$0 Total</p>											

Project 644778

Page 1 of 6 Pages

Exhibit R-2 (PE 0603850F)

517

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE			
04 - Demonstration and Validation	0603850F Integrated Broadcast Service (DEMVAL)		February 2000	644778
(U) A. Mission Description Continued				
(U) FY 2000 (\$ in Thousands)				
(U) \$2,123	Maintain a Program Management Office, including program supervision, finance and acquisition strategy execution			
(U) \$4,913	Systems Engineering, including development of architectures, System of Systems management through the Joint Broadcast Configuration Control Board (JBCCB) and Broadcast Operations Integration Group (BOIG), and Risk Reduction Studies using Simulation Based Acquisition (SBA) tools.			
(U) \$16,180	Design and build Information Management Elements (IMEs). This task area was the major emphasis of the program restructure, resulting in a two phase development of the IMEs and associated IBS dissemination architecture. Phase I (FY 2000) concentrates on the design and development of the IBS architecture.			
(U) \$982	Common Message Format (CMF) development			
(U) \$24,198	Total			
(U) FY 2001 (\$ in Thousands)				
(U) \$2,156	Maintain a Program Management Office, including program supervision, finance and acquisition strategy execution			
(U) \$2,750	Systems Engineering, including maintenance of architectures, System of Systems management through the JBCCB and BOIG, and Risk Reduction Studies using SBA tools.			
(U) \$18,109	Continue the design and build of Information Management Elements (Phase II)			
(U) \$1,000	CMF development			
(U) \$473	Conduct Development Test & Evaluation			
(U) \$24,488	Total			
(U) B. Budget Activity Justification				
	This program is in budget activity 4 because it includes demonstrating and validating the use of technologies to create an operational integrated broadcast service.			
(U) C. Program Change Summary (\$ in Thousands)				
		FY 1999	FY 2000	FY 2001
(U) Previous President's Budget (FY 2000 PBR)				Total Cost
(U) Appropriated Value		0	24,446	TBD
(U) Adjustments to Appropriated Value		0	24,446	TBD
a. Congressional/General Reductions				
b. Small Business Innovative Research				
c. Omnibus or Other Above Threshold Reprogram			-196	
Project 644778	Page 2 of 6 Pages			Exhibit R-2 (PE 0603850F)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE					PROJECT	
04 - Demonstration and Validation	0603850F Integrated Broadcast Service (DEMVAL)					644778	
(U) C. Program Change Summary (\$ in Thousands) Continued	FY 1999	FY 2000	FY 2001	Total Cost			
d. Below Threshold Reprogram		-52		TBD			
e. Rescissions	0		-218				
f. Other							
(U) Adjustments to Budget Years Since FY 2000 PBR							
(U) Current Budget Submit/FY 2001 PBR	0	24,198	24,488				TBD
*FY 1999 IBS RDT&E funds are consolidated in USN PE 0305972N.							
(U) Significant Program Changes:							
- USAF added \$47.4M (RDT&E) for FY 1999-2003 for a partial consolidation of IBS legacy systems' funding.							
- USAF transferred funds in FY 1999 from PE 0208019F/BPAC 674778 to PE 0603850F							
- USN received \$24.9M in a Congressional transfer of IBS and IBS legacy funds in the FY 1999 budget: \$14.580M in RDT&E, \$10.271M in OPN.							
- USAF added an additional \$68.1M (RDT&E) in the FY 2000-2005 budget to complete the consolidation of IBS legacy funds under a single PE.							
(U) D. Other Program Funding Summary (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate
		1,000					
(U) OPAF/PE0208019F							
(U) OPN/PE0305972N	10,271						Cost to Complete
(U) RDT&E, N/PE0305972N	14,580						0
Navy funds in FY 1999 represent amount transferred to the Navy by Congress.							0
(U) E. Acquisition Strategy							
IBS will use an incremental development program to create a common dissemination architecture. Systems and technology will be contracted for under a competitive Request for Proposal (RFP) process.							
(U) F. Schedule Profile	FY 1999	FY 2000	FY 2001				

Project 644778
Page 3 of 6 Pages
Exhibit R-2 (PE 0603850F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE		February 2000		PROJECT	
BUDGET ACTIVITY				PE NUMBER AND TITLE		0603850F Integrated Broadcast Service (DEM/VAL)		644778	
04 - Demonstration and Validation									
<u>(U) F. Schedule Profile Continued</u>									
(U)	Master Acquisition Plan								
(U)	Spiral I								
(U)	- Design								
(U)	- Development								
(U)	- Accreditation Efforts Begin								
(U)	- CANX/CUBE Activities Begin								
(U)	Initiate Program Replan								
(U)	Program Replan Approval								
(U)	Phase I								
(U)	- Quick Pass, Pre-ASP, ASP								
(U)	- Release RFP								
(U)	- Phase I Multiple Awards								
(U)	- Phase I Completion								
(U)									
	* - Denotes completed event								
	X - Denotes planned event								

Project 644778

Page 4 of 6 Pages

Exhibit R-2 (PE 0603850F)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	644778
04 - Demonstration and Validation		0603850F Integrated Broadcast Service (DEM/VAL)									
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	Program Management	FY 1999	FY 2000	FY 2001							
(U)	System Engineering	0	2,123	2,156							
(U)	Information Management Element (Phase I & Phase II)	0	4,913	2,750							
(U)	Common Message Format Development	0	16,180	18,109							
(U)	DT&E	0	982	1,000							
(U)	Total	0	24,198	24,488							
*FY 1999 IBS funds are in USN PE 0305972N											
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or Government	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Total Program	
	Product Development Organizations										
	TBD (Phase I & II)	FFP/CPAF	My00/Jan01	TBD	TBD	0	0	18,843	19,783	Continuing	
	Support and Management Organizations										
	MITRE/ITSP	CPFF	Oct 98	TBD	TBD	0	0	5,355	4,232	Continuing	
	Test and Evaluation Organizations										
	JITC/46th OSS	Project Order	TBD	TBD	TBD	0	0	0	473	Continuing	
(U)	<u>Government Furnished Property:</u>										
	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
	Product Development Property										
	TBD			0	0	0	0	0	Continuing	TBD	

Project 644778
Page 5 of 6 Pages
Exhibit R-3 (PE 0603850F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE									
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL									
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
	Total Program Element (PE) Cost	27,409	47,075	39,246	44,231	47,638	48,592	49,550	Continuing	TBD	
641020	ICBM Guidance Applications	5,349	9,999	16,165	18,192	20,233	20,636	21,044	Continuing	TBD	
641021	ICBM Propulsion Applications	171	179	177	1,666	1,645	1,678	1,710	Continuing	TBD	
641022	ICBM Reentry Vehicle Applications	8,656	15,632	20,439	21,536	22,957	23,417	23,879	Continuing	TBD	
641023	Rocket System Launch Program	10,936	18,930	34	32	33	34	35	Continuing	TBD	
641024	ICBM Command & Control (C2) Applications	171	179	177	438	433	443	451	Continuing	TBD	
644209	Long Range Planning (LRP)	2,126	2,156	2,254	2,367	2,337	2,384	2,431	Continuing	TBD	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	
(U) A. Mission Description											
Efforts identify methods to reduce life cycle costs, improve nuclear safety and surety, support international arms control agreements and disengagement strategies, and ensure continued ICBM viability. Program includes demonstration and validation projects for ICBM guidance options, support reentry vehicles beyond original design life, provide an assessment of current and future ICBM propulsion systems, and develop enhancements to ensure command and control capabilities.											
(U) B. Budget Activity Justification											
This program is in Budget Activity 4 - Demonstration and Validation because the projects are demonstrating the general military utility and/or cost reduction potential of advanced technologies.											
										Exhibit R-2 (PE 0603851F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE
BUDGET ACTIVITY						
04 - Demonstration and Validation						
PE NUMBER AND TITLE						
0603851F ICBM - DEMVAL						
(U)	C. Program Change Summary (\$ in Thousands)	FY 1999	FY 2000	FY 2001	Total Cost	
(U)	Previous President's Budget (FY 2000 PBR)	27,254	28,628	41,693	TBD	
(U)	Appropriated Value	27,337	47,828			
(U)	Adjustments to Appropriated Value	-83				
	a. Congressional/General Reductions	-1				
	b. Small Business Innovative Research		-380			
	c. Omnibus or Other Above Threshold Reprogram	309				
	d. Below Threshold Reprogram	-153	-373			
	e. Rescissions					
	f. Other					
(U)	Adjustments to Budget Years Since FY 2000 PBR			-2,447		TBD
(U)	Current Budget Submit/FY 2001 PBR	27,409	47,075	39,246		TBD
(U)	<u>Significant Program Changes:</u>					
	(U) Changes to FY99 funding included payback to ICBM Guidance Applications for FY98 Omnibus which provided funding for efforts deferred from FY98.					
	(U) FY00 includes a congressional add of \$19,200 in the Rocket System Launch Program (RSLP) project to demonstrate a quick reaction launch capability.					
	(U) FY01 funding in ICBM Reentry Vehicle Applications project reduced to support higher Air Force and DOD priorities.					

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									
BUDGET ACTIVITY		PE NUMBER AND TITLE						DATE	PROJECT
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL						February 2000	641020
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Total Cost
641020	ICBM Guidance Applications	5,349	9,999	16,165	18,192	20,233	20,636	21,044	Continuing
TBD									
(U) <u>A. Mission Description</u>									
<p>The ICBM Guidance Applications Project is required to meet on-going needs in applied strategic guidance systems and their subcomponents. This project ensures the continued readiness of our strategic deterrent forces in response to the Nuclear Posture Review, recommendations of the USSTRATCOM Strategic Advisory Group, CINCSSTRATCOM guidance, and the Defense Science Board Task Force on Nuclear Deterrence. Efforts within this project are focused on current and future missions, disengagement strategies, reduced life cycle costs, and increased nuclear surety and safety. These activities leverage the efforts of the Science and Technology community. The efforts are coordinated with the Navy efforts so as to avoid duplication while realizing maximum return on the invested dollars. A key element of the Guidance Applications Project is the continued preservation of the minimum technical skills and capabilities needed to respond to major modifications to the Minuteman guidance system as well as any degradation of the aging hardware. These unique guidance efforts will demonstrate utility and cost savings potential.</p>									
(U)	<u>FY 1999 (\$ in Thousands)</u>								
(U)	\$2,618	Completed initial AF/Navy coordinated LN-195 guidance system pod flight testing using a high-performance aircraft platform.							
(U)	\$2,273	Continued development and testing of a prototype thrust axis accelerometer concept for strategic guidance system applications.							
(U)	\$458	Continued radiation hardened parts efforts.							
(U)	\$5,349	Total							
(U)	<u>FY 2000 (\$ in Thousands)</u>								
(U)	\$3,808	Continue development and test of thrust axis accelerometer prototype to improve performance, design brass board electronics, and address radiation hardness environment impacts. Continue fiber optic gyroscope development for strategic advanced inertial measurement unit. Begin design of micro mechanical electronics for common strategic guidance system.							
(U)	\$3,976	Continue development and test radiation hardened application-specific integrated circuits (ASICs) and a radiation hardened high throughput microprocessor for strategic weapon system requirements.							
(U)	\$2,215	Continue development of advanced inertial measurement unit (AIMU) concepts emphasizing mechanical, electrical, cooling, data interfaces, and inflight updates. Perform tests and design changes for meeting performance, cost, and compatibility goals.							
(U)	\$9,999	Total							
Project 641020		Page 3 of 28 Pages						Exhibit R-2A (PE 0603851F)	

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603851F ICBM - DEM/VAL	641020	
(U) A. Mission Description Continued			
(U) FY 2001 (\$ in Thousands)			
(U) \$4,233	Continue the design, test, and integration of thrust axis accelerometer.		
(U) \$4,340	Continue development of radiation hard ASICs and high throughput microprocessor.		
(U) \$3,036	Continue design and development of micro mechanical electronics for common guidance system.		
(U) \$2,450	Complete development and test of AIMU concepts.		
(U) \$2,106	Continue follow-on development and demonstration of concepts for common strategic guidance system technology.		
(U) \$16,165	Total		
(U) B. Project Change Summary			
	BTR payback of FY98 Omnibus allowed funding some of the activities deferred from FY98 in FY99.		
(U) C. Other Program Funding Summary (\$ in Thousands)			
		FY 1999 Actual	FY 2000 Estimate
		FY 2001 Estimate	FY 2002 Estimate
		FY 2003 Estimate	FY 2004 Estimate
		FY 2005 Estimate	Cost to Complete
			Total Cost
(U) None.			
(U) D. Acquisition Strategy			
	Accomplish studies and analyses as well as limited engineering and pre-prototype hardware development. All efforts will be conducted under the ICBM Prime Integration Contractor unless other strategies are deemed more appropriate.		
(U) E. Schedule Profile			
		FY 1999	FY 2000
		1 2 3	1 2 3 4
(U) Resume/Complete Advanced IMU Integration Assessments (See Note)			
(U) Start Common Strategic Guidance Systems Technology Concepts Studies			
(U) Inertial Instrument Technology Development (Began 1QFY97, Ongoing)			
(U) Radiation Hardened Parts Analysis (Began 2QFY97, Ongoing)			
	NOTE: Advanced IMU Integration Assessments began 1st Qtr, FY96; however efforts suspended in FY99 due to congressional funding reduction. Project resumed in		
Project 641020		Exhibit R-2A (PE 0603851F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603851F ICBM - DEM/VAL	641020		
(U) <u>E. Schedule Profile Continued</u>				
<div style="display: flex; justify-content: space-between;"> <div> FY00. * - Completed Event X - Planned Event </div> <div> 1 2 3 4 1 4 2 3 4 </div> <div> FY 1999 FY 2000 FY 2001 </div> </div>				
Project 641020		Page 5 of 28 Pages		
		Exhibit R-2A (PE 0603851F)		

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT	
BUDGET ACTIVITY										PE NUMBER AND TITLE		
04 - Demonstration and Validation										0603851F ICBM - DEM/VAL	641020	
(U)	A. Project Cost Breakdown (\$ in Thousands)											
(U)	Advanced IMU Concepts									FY 1999	FY 2000	FY 2001
(U)	Instruments									2,618	2,215	2,450
(U)	Rad Hardness									2,273	3,808	4,233
(U)	Common System Concepts									458	3,976	4,340
(U)	Micro Mechanical Electronics											2,106
(U)	Total									5,349	9,999	16,165
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)											
(U)	Performing Organizations:											
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program	
	Product Development Organizations											
	TRW (Prime)	C/CPAF	Dec 97	Continuing	Continuing	6,177	5,294	9,939	16,105	Continuing	TBD	
	Litton	C/CPAF	Aug 91	18,777	18,777	18,777	0	0	0	0	18,777	
	Lockheed-Martin	C/CPAF	Aug 91	4,136	4,136	4,136	0	0	0	0	4,136	
	Charles Draper Labs (CSDL)	C/CPAF/FFP	Nov 91	11,736	11,736	11,736	0	0	0	0	11,736	
	Support and Management Organizations											
	TRW	SS/CPAF	Oct 95	1,607	1,607	1,607	0	0	0	0	1,607	
	Other Engineering Support	Various	As Req'd	Continuing	Continuing	3,335	55	60	60	Continuing	TBD	
	Test and Evaluation Organizations											
	AF Research Lab	MIPR	As Req'd	2,455	2,455	2,455	0	0	0	0	2,455	
	Central Inertial Guidance Test PO		As Req'd	1,396	1,396	1,396	0	0	0	0	1,396	
	Facility											
	Navy SSP	MIPR	Annual	816	816	816	0	0	0	0	816	
	Wright Labs	MIPR	Jan 97	200	200	200	0	0	0	0	200	

Project 641020

Page 6 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000	PROJECT	641020
BUDGET ACTIVITY		PE NUMBER AND TITLE							
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL							
(U) Government Furnished Property:									
Contract									
Method/Type									
or Funding									
Vehicle									
Product Development Property									
None									
Support and Management Property									
None									
Test and Evaluation Property									
None									
Subtotals									
Subtotal Product Development		Total Prior to FY 1999		Budget FY 1999		Budget FY 2000		Budget to Complete	
		40,826		5,294		9,939		TBD	
Subtotal Support and Management		4,942		55		60		TBD	
Subtotal Test and Evaluation		4,867		0		0		0	
Total Project		50,635		5,349		9,999		TBD	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL								641021	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
641021	ICBM Propulsion Applications	171	179	177	1,666	1,645	1,678	1,710	Continuing	TBD	
(U)	A. Mission Description										
	The ICBM Propulsion Applications project explores improvements and/or alternatives to current ICBM propulsion systems as well as conducting studies assessing future ICBM propulsion system requirements.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$171	Completed propulsion cost and performance studies for Ballistic Missile Replacement (BMR) design concepts.									
(U)	\$171	Total									
(U)	FY 2000 (\$ in Thousands)										
(U)	\$179	Conduct studies and assessment of technological developments in support of ICBM propulsion system(s).									
(U)	\$179	Total									
(U)	FY 2001 (\$ in Thousands)										
(U)	\$177	Continue studies and assessment of technological developments in support of ICBM propulsion system(s).									
(U)	\$177	Total									
(U)	B. Project Change Summary										
	No significant changes.										
(U)	C. Other Program Funding Summary (\$ in Thousands)										
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
(U)	None										
(U)	D. Acquisition Strategy										
	Studies and analyses will be accomplished. All efforts will be conducted under the ICBM Prime Integration Contractor unless other strategies are deemed more appropriate.										

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL								641021	
(U)	<u>E. Schedule Profile</u>										
(U)	Begin/Complete BMR Design Concept Study	1	2	3	4	1	2	3	4		
(U)	Conduct Studies & Technology Assessments (Began 1QFY00, Ongoing)	*			*						
	* - Completed Event										
	X - Planned Event										

Project 641021

Page 9 of 28 Pages

Exhibit R-2A (PE 0603851F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY		PE NUMBER AND TITLE				DATE	PROJECT		
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL					February 2000		
							641021		
(U)	A. Project Cost Breakdown (\$ in Thousands)								
(U)	Contract Engineering Support						FY 2000	FY 2001	
(U)	Total						179	177	
							179	177	
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)								
(U)	Performing Organizations:								
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete
	Product Development Organizations								Total Program
	TRW (Prime)	C/CPAF	Dec 97	Continuing	Continuing	167	167	175	
	Atlantic Research	SS/CPAF	Annual	640	640	640			TBD
	Support and Management Organizations								640
	Prog Management	Various	As Req'd	Continuing	Continuing	27	4	4	
	Test and Evaluation Organizations								TBD
	None								
(U)	Government Furnished Property:								
	Contract								
	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date						Total Program
	Item Description								
	Product Development Property								
	None								
	Support and Management Property								
	None								
	Test and Evaluation Property								
	None								

Project 641021

Page 10 of 28 Pages

Exhibit R-3 (PE 0603851F)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT					
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL				641021					
		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program				
Subtotals											
Subtotal Product Development		807	167	175	172	TBD	TBD				
Subtotal Support and Management		27	4	4	5	TBD	TBD				
Subtotal Test and Evaluation											
Total Project		834	171	179	177	TBD	TBD				

Project 641021

Page 11 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)						DATE		February 2000		
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT				
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL				641022				
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
641022	ICBM Reentry Vehicle Applications	8,656	15,632	20,439	21,536	22,957	23,417	23,879	Continuing	TBD
(U) A. Mission Description										
ICBM Reentry Vehicle (RV) Applications efforts are required to support the deployed ICBM force with emphasis on implementing arms control treaties/initiatives directing the downloading of the Minuteman force to a single RV configuration, equipping the Minuteman force with the safest and most reliable RVs, and exploring options for satisfying future requirements. These efforts will support RVs beyond their original design life by addressing problems with operational reentry systems, meeting real on-going needs, and ensuring the availability of long-lead components/materials. This project will develop methods to better predict aging phenomena and identify life cycle cost reduction methods. Additionally, these efforts will maintain a minimum level of technical engineers and critical skills to respond to aging phenomena and future requirements. RV work conducted under this program will leverage the Science & Technology community investments and coordinate with Navy RV efforts to eliminate duplication and realize synergistic cost savings.										
(U)	FY 1999 (\$ in Thousands)									
(U)	\$3,892	Performed ground and flight tests in continuing evaluation of RV material subsystems, materials aging, and material replacements.								
(U)	\$2,364	Continued design, development, and prototype testing of selected fuze assessment/measurement methodologies.								
(U)	\$664	Continued design, development, and prototype testing of selected sensors/instruments.								
(U)	\$646	Continued identifying and ground testing potential replacement options for critical RV components.								
(U)	\$1,090	Continued evaluation of improved accuracy assessment methodology.								
(U)	\$8,656	Total								
(U)	FY 2000 (\$ in Thousands)									
(U)	\$5,432	Continue evaluation of RV material subsystems, materials aging, and material replacements by performing ground and flight tests.								
(U)	\$3,463	Continue design, development, and prototype testing of selected fuze assessment/measurement methodologies.								
(U)	\$2,176	Evaluate advanced common RV designs, applications, and technologies.								
(U)	\$2,478	Develop and assess RV Test & Evaluation methodologies and subsystems.								
(U)	\$1,050	Continue identifying and ground testing potential replacement options for critical RV components.								
(U)	\$1,033	Continue to evaluate improved accuracy measurement and methodology.								
(U)	\$15,632	Total								

Project 641022

Page 12 of 28 Pages

Exhibit R-2A (PE 0603851F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000																																															
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																																
04 - Demonstration and Validation	0603851F ICBM - DEM/VAL	641022																																																
<p>(U) A. Mission Description Continued</p> <p>(U) FY 2001 (\$ in Thousands)</p> <p>(U) \$5,543 Continue evaluation of RV material subsystems, materials aging, and material replacements by performing ground and flight tests.</p> <p>(U) \$1,853 Evaluate alternate flight test experiment options.</p> <p>(U) \$3,976 Continue design, development, and prototype testing of selected fuze assessment/measurement methodologies.</p> <p>(U) \$3,772 Continue evaluation of advanced common RV designs, applications, and technologies.</p> <p>(U) \$2,567 Continue development and assessment of RV Test & Evaluation methodologies and subsystems.</p> <p>(U) \$1,523 Continue identifying and ground testing potential replacement options for critical RV components.</p> <p>(U) \$1,205 Continue evaluation of improved accuracy measurement and methodology.</p> <p>(U) \$20,439 Total</p> <p>(U) B. Project Change Summary</p> <p>FY01 request reduced by \$2,300 to support higher Air Force priorities. The FY01 task to evaluate alternate flight test experiment options reduced accordingly; some planned effort deferred a year.</p> <p>(U) C. Other Program Funding Summary (\$ in Thousands)</p> <table border="1"> <thead> <tr> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> <th>FY 2002</th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> <th>Cost to</th> <th>Total Cost</th> </tr> <tr> <th>Actual</th> <th>Estimate</th> <th>Estimate</th> <th>Estimate</th> <th>Estimate</th> <th>Estimate</th> <th>Estimate</th> <th>Complete</th> <th></th> </tr> </thead> <tbody> <tr> <td>(U) None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(U) D. Acquisition Strategy</p> <p>Studies and analyses as well as limited engineering and pre-prototype hardware development will be accomplished. All efforts will be conducted under the ICBM Prime Integration Contractor unless other strategies are deemed more appropriate.</p> <p>(U) E. Schedule Profile</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> </tr> </thead> <tbody> <tr> <td>(U) MATERIALS REPLACEMENT & AGING EVALUATION</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>(U) --Design, Develop & Test Selected Technologies (Began IQFY96, Ongoing)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) FUZE ASSESSMENT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) --Design, Develop & Test Measurement Tools (Began IQFY96,</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost	Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete		(U) None										FY 1999	FY 2000	FY 2001	(U) MATERIALS REPLACEMENT & AGING EVALUATION	1	2	3	(U) --Design, Develop & Test Selected Technologies (Began IQFY96, Ongoing)				(U) FUZE ASSESSMENT				(U) --Design, Develop & Test Measurement Tools (Began IQFY96,			
FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost																																										
Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete																																											
(U) None																																																		
	FY 1999	FY 2000	FY 2001																																															
(U) MATERIALS REPLACEMENT & AGING EVALUATION	1	2	3																																															
(U) --Design, Develop & Test Selected Technologies (Began IQFY96, Ongoing)																																																		
(U) FUZE ASSESSMENT																																																		
(U) --Design, Develop & Test Measurement Tools (Began IQFY96,																																																		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)					DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL				641022
(U)	E. Schedule Profile Continued					
	Ongoing)	1	2	3	4	1
						2
						3
						4
(U)	SENSOR/INSTRUMENTATION INTEGRATION					
(U)	--Design, Develop & Test Sensors/Instruments (Began 1QFY96,					
(U)	Ongoing)					
(U)	CRITICAL COMPONENTS					
(U)	--Design, Develop & Test Replacement Options (Began 1QFY96,					
(U)	Ongoing)					
(U)	RV TEST & EVALUATION METHODOLOGIES					
(U)	--Design, Develop & Test Methods/Subsystems (Began 1QFY00,					
(U)	Ongoing)					
(U)	ACCURACY ASSESSMENT METHODOLOGY					
(U)	--Evaluate Accuracy Measurement Techniques (Began 1QFY96,					
(U)	Ongoing)					
(U)	ADVANCED COMMON RV DESIGNS, APPLICATIONS &					
(U)	TECHNOLOGIES					
(U)	--Identify & Evaluate Options (Ongoing)					
(U)	ALTERNATE FLIGHT TEST OPTIONS					
(U)	--Identify, Develop & Test Options (Begins 1QFY01, Ongoing)					
(U)	* - Completed Event					
(U)	X - Planned Event					

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE									
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL									641022
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	Materials & Prediction Methodologies	FY 1999	FY 2000	FY 2001						FY 2001	
(U)	Fuze Assessment	3,892	5,432	5,543						5,543	
(U)	Sensor/Instruments	2,364	3,463	3,976						3,976	
(U)	Identify/ground test critical components	664									
(U)	Accuracy Assessment Measures Methodology	646	1,302	1,704						1,704	
(U)	Evaluate Flight Test Experiments	1,090	1,033	1,205						1,205	
(U)	Evaluate Advanced Common RV		2,176	3,772						3,772	
(U)	Develop & Assess RV T&E Methods		2,226	2,386						2,386	
(U)	Total	8,656	15,632	20,439						20,439	
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or Government	Contract Method/Type	Award or Obligation Date	Performing Activity	Project Office	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
	Activity	Vehicle		EAC	EAC						
	<u>Product Development Organizations</u>										
	Textron	C/CPAF	Various	8,636	8,636	8,636	0	0	0	0	8,636
	Lockheed-Martin	C/CPAF	Various	13,530	13,530	13,530	0	0	0	0	13,530
	Boeing-North American	C/CPAF	Various	560	560	560	0	0	0	0	560
	TRW (Prime)	C/CPAF	Dec 97	Continuing	Continuing	404	7,796	14,157	18,639	Continuing	TBD
	<u>Support and Management Organizations</u>										
	TRW	SS/CPAF	Oct 95	2,692	2,692	2,692	0	0	0	0	2,692
	Other Engineering & Management Support	Various	Ongoing	Continuing	Continuing	515	59	100	100	Continuing	TBD

Project 641022

Page 15 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										
BUDGET ACTIVITY					DATE		PROJECT			
04 - Demonstration and Validation					0603851F ICBM - DEM/VAL		February 2000			
0603851F ICBM - DEM/VAL					641022					
(U) Performing Organizations Continued:										
Test and Evaluation Organizations										
Wright Lab	MIPR	Annual	Continuing	Continuing	686	291	450	450	Continuing	TBD
AEDC	PO	Annual	Continuing	Continuing	972	280	475	700	Continuing	TBD
Sandia National Lab (SNL)	MIPR	As Req'd	Continuing	Continuing	83	0	0	0	Continuing	TBD
Vandenberg AFB	PO	As Req'd	Continuing	Continuing	0	230	250	250	Continuing	TBD
NH & S	PO	As Req'd	Continuing	Continuing	0	0	200	300	Continuing	TBD
(U) Government Furnished Property:										
Contract										
Item	Method/Type	Award or	Delivery	Total Prior	Budget	Budget	Budget	Budget to	Total	
Description	or Funding	Obligation	Date	to FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program	
Vehicle	Date									
Product Development Property										
None										
Support and Management Property										
None										
Test and Evaluation Property										
None										
Subtotals										
Subtotal Product Development				Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program	
				23,130	7,796	14,157	18,639	TBD	TBD	
Subtotal Support and Management				3,207	59	100	100	TBD	TBD	
Subtotal Test and Evaluation				1,741	801	1,375	1,700	TBD	TBD	
Total Project				28,078	8,656	15,632	20,439	TBD	TBD	

Project 641022

Page 16 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL								641023		
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
641023	Rocket System Launch Program	10,936	18,930	34	32	33	34	35	Continuing	TBD		
(U)	A. Mission Description											
	This task supports studies/analysis on hardware for cost effective use of excess missile assets.											
(U)	FY 1999 (\$ in Thousands)											
(U)	\$29											
(U)	\$10,907											
(U)	\$10,936											
(U)	Total											
(U)	FY 2000 (\$ in Thousands)											
(U)	\$32											
(U)	\$18,898											
(U)	Prepare for/conduct two quick reaction launch capability demonstrations; one in support of the Northern Edge Joint Training Exercise and the other as part of the Advanced Solid Axial Stage (ASAS) development effort.											
(U)	Total											
(U)	FY 2001 (\$ in Thousands)											
(U)	\$34											
(U)	Continue on-going study/analysis for the adoption of low cost front-end systems for use on deactivated missile assets.											
(U)	Total											
(U)	B. Project Change Summary											
(U)	(U) FY00 \$19,200 Congressional add being used for quick reaction launch capability demonstrations consistent with congressional language.											
(U)	C. Other Program Funding Summary (\$ in Thousands)											
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost			
(U)	None											
Project 641023		Page 17 of 28 Pages								Exhibit R-2A (PE 0603851F)		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603851F ICBM - DEM/VAL	641023	

Studies and analyses will be performed primarily in-house augmented with contractor support as required. Special projects that might be funded under this project that require the development and/or evaluation of hardware along with the associated employment concepts will be awarded to qualified industry sources following open competition.

	<u>FY 1999</u>			<u>FY 2000</u>			<u>FY 2001</u>		
	1	2	3	4	1	2	3	4	
Start/Complete Annual Studies/Analysis									
Quick Reaction Launch Capability Demo (Start)									
--Northern Edge launch									
--ASAS launch									
* - Completed Event									
X - Planned Event									

Project 641023

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY										PROJECT	641023
04 - Demonstration and Validation										PE NUMBER AND TITLE 0603851F ICBM - DEM/VAL	
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	Studies/Analyses									FY 1999	FY 2000
(U)	Quick Reaction Launch Capability Demonstrations									29	32
(U)	--Northern Edge Exercise Quick Reaction Launch										
(U)	--ASAS Quick Reaction Launch									9,200	9,698
(U)	CBM Funding (Under Review)									10,907	18,930
(U)	Total									10,936	34
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or	Contract									
	Government	Method/Type	Award or	Performing	Project						
	Performing	or Funding	Obligation	Activity	Office	Total Prior	Budget	Budget	Budget	Budget to	Total
	Activity	Vehicle	Date	EAC	EAC	to FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program
<u>Product Development Organizations</u>											
Textron		C/CPFF	Apr 97	4,900	4,900	4,900	0	0	0	0	4,900
Textron		C/CPIF	Aug 98	3,500	3,500	3,500	0	0	0	0	3,500
Textron		C/CPIF	Aug 98	12,205	12,205	12,205	0	0	0	0	12,205
AF Research Lab		MIPR	Mar 97	2,744	2,744	1,744	1,000	0	0	0	2,744
Wright Lab		MIPR	Mar 97	900	900	900	0	0	0	0	900
Florida National Guard		MIPR	Jul 97/Jan 00	12,198	12,198	2,500	4,600	0	0	0	7,100
Various		Various	As Req'd	N/A	N/A	1,995	1,400	0	0	0	3,395
Orbital Sciences Corp		SS/FPFIF	Feb 00	9,200	9,200	0	0	4,900	0	0	4,900
Kodiak Launch Complex		SS/FFP	Pending	800	800	0	0	800	0	0	800
OO-ALC/LM (ICBM SPO)		MIPR	Pending	3,000	3,000	0	0	3,000	0	0	3,000
Project 641023										Page 19 of 28 Pages	
										Exhibit R-3 (PE 0603851F)	

541

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE	PROJECT			
04 - Demonstration and Validation					0603851F ICBM - DEM/VAL 641023				
(U) Performing Organizations Continued:									
Support and Management Organizations									
TRW	Mar 97	N/A	N/A	4,077	29	2,000	34	Continuing	6,106
Various	As Req'd	Continuing	Continuing	548		30			TBD
CBM Funding (Under Review)					10,907				10,907
Test and Evaluation Organizations									
AEDC	Feb 98	1,000	1,000	1,000	0	0			1,000
Pt Magu Missile Range	Pending	1,200	1,200	0	0	1,200	0	0	1,200
(U) Government Furnished Property:									
Contract									
Item	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program	
Description	Vehicle								
Product Development Property									
None									
Support and Management Property									
None									
Test and Evaluation Property									
None									
Subtotals									
Subtotal Product Development									
Subtotal Support and Management									
Subtotal Test and Evaluation									
Total Project									
Project 641023									
Exhibit R-3 (PE 0603851F)									

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL								641024	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
641024	ICBM Command & Control (C2) Applications	171	179	177	438	433	443	451	0	0	
<p>(U) A. Mission Description</p> <p>To maintain the ICBM weapon systems as a credible deterrent to a hostile attack requires an extremely high confidence in the command and control (C2) systems providing connectivity to the National Command Authority (NCA). To ensure the ICBMs can be tasked in all manners of hostile environments requires assured, survivable, and secure channels of communication to the missile Launch Control Centers (LCCs). While assured connectivity is mandated for ICBMs, ways must be found to make the C2 systems cost efficient. Continuing studies are needed to identify existing and future technologies as well as concepts that exploit state-of-the-art communications and information transfer techniques that will guarantee the required C2 support to both the current ICBM mission and those ICBM systems and missions that will evolve in the 21st century. This program funds efforts to accomplish studies, demonstrations, and tests to ensure future ICBM C2 architectures, networks, and systems evolve in a planned, orderly, and cost efficient manner while meeting the stringent requirements of nuclear command and control.</p> <p>(U) <u>FY 1999 (\$ in Thousands)</u></p> <p>(U) \$171 Analysis of the Fiber Optic Link/Hardened Intersite Cable System (HICS) upgrade completed.</p> <p>(U) \$171 Total</p> <p>(U) <u>FY 2000 (\$ in Thousands)</u></p> <p>(U) \$179 Study alternatives and future concepts for a command, control, and communications system architecture supporting ballistic missile applications.</p> <p>(U) \$179 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u></p> <p>(U) \$177 Continue to develop and refine alternatives and concepts for a command, control, and communications system architecture supporting ballistic missile applications.</p> <p>(U) \$177 Total</p> <p>(U) B. Project Change Summary</p> <p>No significant changes.</p>											

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE	
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL	
(U) C. Other Program Funding Summary (\$ in Thousands)			
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate
(U) None			
(U) D. Acquisition Strategy			
Studies and analyses will be accomplished. All efforts will be conducted under the ICBM Prime Integration Contract unless other strategies are deemed more appropriate.			
(U) E. Schedule Profile			
	FY 1999	FY 2000	FY 2001
	1 2 3	4 1 2	3 4
(U) Start/Complete Fiber Optics Link/HICS Upgrade Study	*		
(U) Future Concepts Study for Command & Control (Ongoing)			
* - Completed Event			
X - Planned Event			
Project 641024		Exhibit R-2A (PE 0603851F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					PE NUMBER AND TITLE		DATE		PROJECT
04 - Demonstration and Validation					0603851F ICBM - DEM/VAL		February 2000		641024
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>								
(U)	Contract Engineering Support						FY 1999	FY 2000	FY 2001
(U)	Total						171	179	177
							171	179	177
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>								
(U)	<u>Performing Organizations:</u>								
	<u>Contractor or</u>	<u>Contract</u>							
	<u>Government</u>	<u>Method/Type</u>	<u>Award or</u>	<u>Performing</u>	<u>Project</u>				
	<u>Performing</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Activity</u>	<u>Office</u>				
	<u>Activity</u>	<u>Vehicle</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>				
	<u>Product Development Organizations</u>				<u>Total Prior</u>				
	Alliant	SS/CPAF	Dec 99	15	to FY 1999				
	TRW (Prime)	C/CPAF	Dec 97	Continuing	1,461				
	<u>Support and Management Organizations</u>								
	Various	Various	As Req'd	N/A	10				
	<u>Test and Evaluation Organizations</u>								
	None								
(U)	<u>Government Furnished Property:</u>								
	<u>Contract</u>								
	<u>Method/Type</u>	<u>Award or</u>							
	<u>or Funding</u>	<u>Obligation</u>							
	<u>Vehicle</u>	<u>Date</u>							
	<u>Product Development Property</u>								
	None								
	<u>Support and Management Property</u>								
	None								
	<u>Test and Evaluation Property</u>								
	None								
Project 641024					Page 23 of 28 Pages		Exhibit R-3 (PE 0603851F)		

545

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT		
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL		641024		
Subtotals	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Subtotal Product Development	1,476	166	175	177	TBD	TBD
Subtotal Support and Management	10	5	4	0	TBD	TBD
Subtotal Test and Evaluation						
Total Project	1,486	171	179	177	TBD	TBD

Project 641024

Page 24 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL								644209		
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
644209	Long Range Planning (LRP)	2,126	2,156	2,254	2,367	2,337	2,384	2,431	Continuing	TBD		
(U) A. Mission Description												
The Long Range Planning (LRP) task analyzes ICBM systems to identify potential modifications required to meet user objectives relative to long term sustainment, technology insertion, employment, and force structure. The studies focus on system supportability, operability, reliability, and maintainability. Options/concepts generated by these studies are evaluated for feasibility, system impacts, and cost.												
(U)	FY 1999 (\$ in Thousands)											
(U)	\$490	Continued support of Long Range Planning tasks to include development of the Systems Options Report and update of the Logistics Program Management Plan and the ICBM Master Plan.										
(U)	\$983	Continued feasibility and life extension studies.										
(U)	\$653	Continued technology insertion studies.										
(U)	\$2,126	Total										
(U)	FY 2000 (\$ in Thousands)											
(U)	\$500	Continue support of Long Range Planning tasks, development of the Systems Options Report, and update of the Logistics Program Management Plan and the ICBM Master Plan.										
(U)	\$892	Continue to perform feasibility and life extension studies.										
(U)	\$764	Continue to perform technology insertion studies in support of changing ICBM environments.										
(U)	\$2,156	Total										
(U)	FY 2001 (\$ in Thousands)											
(U)	\$510	Continue support of Long Range Planning tasks, development of the Systems Options Report, and update of the Logistics Program Management Plan and the ICBM Master Plan.										
(U)	\$945	Continue to perform feasibility and life extension studies.										
(U)	\$799	Continue to perform technology insertion studies in support of changing ICBM environments.										
(U)	\$2,254	Total										
Project 644209		Page 25 of 28 Pages									Exhibit R-2A (PE 0603851F)	

547

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)						DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE					
04 - Demonstration and Validation		0603851F ICBM - DEM/VAL				February 2000 644209	
(U) B. Project Change Summary							
No significant changes.							
(U) C. Other Program Funding Summary (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate
(U) None							Total Cost
(U) D. Acquisition Strategy							
Studies and analyses will be accomplished. Efforts will be conducted using contracting strategies deemed most appropriate.							
(U) E. Schedule Profile							
(U) Contract Award for Annual Studies/Analyses	1	2	3	4	1	2	3
(U) Program Reviews	*					X	4
(U) Reports Received		*				X	X
* - Completed Event				*			X
X - Planned Event							X

Exhibit R-2A (PE 0603851F)

 Page 26 of 28 Pages

 Project 644209

Page 26 of 28 Pages

Exhibit R-2A (PE 0603851F)

548

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603851F ICBM - DEM/VAL		644209		
(U)	A. Project Cost Breakdown (\$ in Thousands)								
(U)	Long Range Planning Tasks				FY 1999	FY 2000	FY 2001		
(U)	Feasibility Studies				490	500	510		
(U)	Technology Insertion Studies				983	892	945		
(U)	Total				653	764	799		
(U)					2,126	2,156	2,254		
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)								
(U)	Performing Organizations:								
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001 Complete
	Product Development Organizations								
	TRW (Prime)	C/CPAF	Dec 97	N/A	N/A	322	580	1,615	468 Continuing
	TRW	SS/CPAF	Oct 95	N/A	N/A	5,359	1,312	0	TBD 6,671
	Alliant			N/A	N/A			40	40
	McCallie	SS/CR/FFP	Nov 99	N/A	N/A			128	128
	TBD	TBD	Annually	N/A	N/A				TBD
	Support and Management Organizations								
	TRW	C/CPAF	Oct 95	9,913	9,913	9,913	0	0	9,913
	Various	Various	Ongoing	N/A	N/A	1,783	234	373	154 Continuing
	Test and Evaluation Organizations								
	None								
(U)	Government Furnished Property:								
	Contract	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001 Complete	Total Program
	Item Description								
Project 644209					Exhibit R-3 (PE 0603851F)				
					Page 27 of 28 Pages				

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603851F ICBM - DEM/VAL		February 2000		
(U) Government Furnished Property Continued:					PE NUMBER AND TITLE		644209		
Contract									
Item	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Product Development Property									
None									
Support and Management Property									
None									
Test and Evaluation Property									
None									
Subtotals									
Subtotal Product Development				Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
				5,681	1,892	1,783	2,100	TBD	TBD
Subtotal Support and Management				11,696	234	373	154	TBD	TBD
Subtotal Test and Evaluation									
Total Project				17,377	2,126	2,156	2,254	TBD	TBD

Project 644209

Page 28 of 28 Pages

Exhibit R-3 (PE 0603851F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY										PE NUMBER AND TITLE	
04 - Demonstration and Validation										0603854F Wideband MILSATCOM (Space)	
COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
Total Program Element (PE) Cost	65,242	50,277	134,029	128,814	52,036	96,570	304,239	1,906,737	2,859,821		
642679 Global Broadcast Service (GBS) Phases 1 and 2	64,573	45,367	30,206	32,566	25,529	16,973	15,640	40,237	392,968		
644811 Wideband Gapfiller	669	4,910	92,323	82,948	2,107	1,637	1,937	0	186,531		
644812 Advanced Wideband	0	0	0	0	0	31,360	260,762	1,866,500	2,158,622		
644870 Command & Control System Consolidated (CCSC)	0	0	11,500	13,300	24,400	46,600	25,900	0	121,700		
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

Notes:

1. The GBS program cost and schedule are currently being rebaselined due to additional technical issues which occurred since the 6 month slip identified in the Feb 1999 SAR.

2. BPAC 644870 has been added to this PE for MILSATCOM Command and Control System - Consolidated (CCS-C) which is a FY01 new start effort.

(U) A. Mission Description

Provide DoD with high data rate (wideband) MILSATCOM services in accordance with the Joint Requirements Oversight Council (JROC), Joint Space Management Board approved MILSATCOM Architecture (Aug 96), and the MILSATCOM Capstone Requirements Document (CRD) approved by the JROC in Oct 97.

Global Broadcast Service (GBS) will provide efficient, high data rate broadcast capability between many distributed information sources and warfighters who receive the broadcast directly on small, inexpensive user terminals. Broadcast data includes digitized imagery, logistics and weather data, maps, operational orders and video. The GBS program was established as a three-phase program that was approved by the JROC in late 1995. Phase 1 was started in 1996 and uses commercial satellite leases to provide a Continental United States (CONUS)-based testbed for requirements definition and operational concept refinement. Phase 2 provides a near worldwide, limited capability at military frequencies hosted on the last three Navy Ultra High Frequency follow-on satellites. GBS Phase 2 space segment was complete with UFO 10 launch in Nov 1999. Phase 3 will provide a global capability integrated into a conceptual Advanced Wideband System. The Air Force was designated executive agent for the GBS Program by USD(A&T) on 27 Mar 1996.

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

04 - Demonstration and Validation

0603854F Wideband MILSATCOM (Space)

(U) **A. Mission Description Continued**

The JROC approved the OSD-led transition to implement the MILSATCOM architecture in Sept 97. The transition includes 3 Wideband Gapfiller satellites to be launched in 2004/5. The Wideband Gapfiller System is intended to minimize the probability of a gap in wideband service between current and follow-on systems, and to incorporate the best commercial technology and practices available at the time. A worldwide constellation of Advanced Wideband satellites with launches starting in 2008 will replace current wideband systems and incorporate the latest in commercial capabilities. Both programs will include a broadcast space segment (GBS Phase 2 compatible, on Wideband Gapfiller; GBS Phase 3 on Advanced Wideband). The Command and Control System-Collocated (CCS-C) provides an integrated commercial-based command and control system for the MILSATCOM satellite constellations. This is a new start in FY01.

(U) **B. Budget Activity Justification**

(U) Funding is in Budget Activity 4, Demonstration and Validation, since it supports Global Broadcast Service technology demonstration and validation.

(U) **C. Program Change Summary (\$ in Thousands)**

	FY 1999	FY 2000	FY 2001	Total Cost
(U) Previous President's Budget (FY 2000 PBR)	69,376	53,344	97,756	2,357,206
(U) Appropriated Value	70,147	50,344		
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions	-771	-67		
b. Small Business Innovative Research	-398			
c. Omnibus or Other Above Threshold Reprogram	1,959			
d. Below Threshold Reprogram	-5,695			
e. Rescissions				
f. Other				
(U) Adjustments to Budget Years Since FY 2000 PBR			36,273	
(U) Current Budget Submit/FY 2001 PBR	65,242	50,277	134,029	2,859,821

(U) **Significant Program Changes:**

(U) \$1,959K FY99 reprogramming funded receive suites supporting transition from the Bosnia Command and Control Augmentation to GBS.

(U) \$36,273K FY01 increase fully funded WGS non-recurring engineering efforts.

(U) FY02-05 funding for one WGS satellite was realigned from RDT&E to the Missile Procurement appropriation.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	
04 - Demonstration and Validation	0603854F Wideband MILSATCOM (Space)	
<p>(U) <u>C. Program Change Summary (\$ in Thousands) Continued</u></p> <p>(U) <u>Significant Program Changes Continued:</u></p> <p>(U) The total PE cost increased due to the above adjustments as well as, revised outyear estimates for the Advanced Wideband System.</p>		
Page 3 of 20 Pages		Exhibit R-2 (PE 0603854F)

553

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT	
04 - Demonstration and Validation			0603854F Wideband MILSATCOM (Space)							642679	
COST (\$ in Thousands)			FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
642679	Global Broadcast Service (GBS) Phases 1 and 2		64,573	45,367	30,206	32,566	25,529	16,973	15,640	40,237	392,968
Note: The GBS program cost and schedule are currently being re-baselined due to additional technical issues which occurred since the 6 month slip identified in the Feb 99 SAR.											
(U) A. Mission Description											
Acquires phases 1 and 2 of the GBS program to provide DoD with efficient, high data rate connectivity to many distributed information sources and warfighters who will receive the broadcast directly on small, inexpensive user terminals in accordance with the GBS Operational Requirements Document (ORD) validated by the Joint Requirements Oversight Council in Apr 1995. Broadcast data includes digitized imagery, logistics and weather data, maps, operational orders (e.g., Air Tasking Order), and video. Phase 1 is a single channel leased through FY98 for initial testing and concept exploration. Phase 2 is the initial ground infrastructure for broadcast management, uplink and receive equipment. The GBS Phase 2 space segment was complete with the UFO 10 launch in Nov 1999. This ground infrastructure works with GBS packages hosted on three Navy UHF Follow-on (UFO) satellites providing near-worldwide service.											
(U) FY 1999 (\$ in Thousands)											
System Development and Test											
(U) \$33,187 Initial Comm Connectivity/Interface, CONUS Transponder Lease											
(U) \$6,652 Phase 2 Government System Integration											
(U) \$17,299 Field Survey and Integration											
(U) \$654 Navy Terminals											
(U) \$6,000 System Test & Evaluation Support											
(U) \$781 Total											
(U) \$64,573											
(U) FY 2000 (\$ in Thousands)											
System Development and Test											
(U) \$13,103 Initial Comm Connectivity/Interface, CONUS Transponder Lease											
(U) \$6,743 Phase 2 Government System Integration											
(U) \$15,416 Field Survey and Integration											
(U) \$109 Navy Terminals											
(U) \$6,000 System Test & Evaluation Support											
(U) \$782 Joint Terminals Engineering Office (JTEO) Support											
(U) \$3,214											
Project 642679											
Page 4 of 20 Pages										Exhibit R-2A (PE 0603854F)	

554

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603854F Wideband MILSATCOM (Space)	642679	
(U) A. Mission Description Continued			
(U) FY 2000 (\$ in Thousands) Continued			
(U) \$45,367	Total		
(U) FY 2001 (\$ in Thousands)			
(U) \$12,968	System Development and Test		
(U) \$3,555	Initial Comm Connectivity/Interface, CONUS Transponder Lease		
(U) \$7,106	Phase 2 Government System Integration		
(U) \$6,000	Navy Terminals		
(U) \$577	System Test and Evaluation Support		
(U) \$30,206	Total		
(U) B. Project Change Summary			
(U) \$1,959K FY99 reprogramming funded receive suites supporting transition from the Bosnia Command and Control Augmentation to GBS			
(U) C. Other Program Funding Summary (\$ in Thousands)			
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate
(U) Related RDT&E: None			
(U) Other APPN			
(U) Air Force GBS receive terminals. Included in BPAC 836780, line P-67 -- PE 33601, Milstar Satellite Comm Sys, Other Procurement, AF			
(U) Navy SATCOM Ship Terminal Programs			
(U) Army Ground Terminal Programs			
(U) Navy UFO Program			
(U) ARPA-DISA Bosnia			
Project 642679			
		FY 2002 Estimate	FY 2003 Estimate
		FY 2004 Estimate	FY 2005 Estimate
		Cost to Complete	Total Cost
Page 5 of 20 Pages		Exhibit R-2A (PE 0603854F)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)						DATE	February 2000			
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT				
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)				642679				
(U)	<u>C. Other Program Funding Summary (\$ in Thousands)</u>	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate		
	Command and Control Augmentation Program (BC2A) and Joint Broadcast Service (JBS)									
(U)	ARPA Battlefield Awareness and Data Dissemination (BADD) Advanced Concept Technical Demonstration (ACTD)									
(U)	DISA Long Haul Communications									
(U)	<u>D. Acquisition Strategy</u>									
	(U) Evolutionary acquisition approach making maximum use of commercial technology and acquisition practices. Single integration contractor with total system performance responsibility. (Navy providing space segment for Phase 2 and adapting common receive terminal equipments for shipboard installation.)									
(U)	<u>E. Schedule Profile</u>									
	(U) Phase 1 (96-98)									
(U)	Joint Warfighter Interoperability Demos (JWID)									
(U)	Lease Commercial Transponder									
(U)	Phase 2 (98-00+)									
(U)	Aquisition Milestone I/II (Nov 98)									
(U)	Launch UFO #8 (Mar 98)									
(U)	Launch UFO #9 (Oct 98)									
(U)	Launch UFO #10 (Nov 99)									
(U)	Initial Operational Capability								X	
(U)	Milestone III								X	

Page 6 of 20 Pages
 Project 642679
 Exhibit R-2A (PE 0603854F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603854F Wideband MILSATCOM (Space)	642679	
(U) <u>E. Schedule Profile Continued</u>			
		FY 1999	FY 2000
		1 2 3 4 1 2 3 4	FY 2001
			2 3 4
* = Completed Event			
X = Planned Event			
Project 642679		Exhibit R-2A (PE 0603854F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT			642679			
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)									
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>										
(U)	System Development and Test	FY 1999	FY 2000	FY 2001							
(U)	Communication Connectivity/Interface	33,187	13,103	12,968							
(U)	Phase 2 Government System Integration	6,652	6,743	3,555							
(U)	Field Survey and Integration	17,299	15,416	7,106							
(U)	Navy Terminals	654	109	0							
(U)	System Test & Eval Support	6,000	6,000	6,000							
(U)	JTEO Support	781	782	577							
(U)	Total	0	3,214	0							
(U)		64,573	45,367	30,206							
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U)	<u>Performing Organizations:</u>										
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Total Program	
	Product Development Organizations										
	Raytheon Sys Co.	CPAF	18 Nov 97	124,782	124,782	58,855	33,187	19,103	12,968	168,537	
	Government/Various	Various	Various	N/A	N/A	34,601	19,221	12,844	10,794	113,806	
	Support and Management Organizations										
	Various	Various	Various	N/A	N/A	28,314	11,384	12,638	5,867	107,612	
	Test and Evaluation Organizations										
	Support for Development & Operational Test	Various	Various	N/A	N/A	107	781	782	577	3,013	
(U)	<u>Government Furnished Property:</u>										
	Contract										
	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program		
	Item Description										
Project 642679											
Page 8 of 20 Pages											
Exhibit R-3 (PE 0603854F)											

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	PROJECT
BUDGET ACTIVITY				PE NUMBER AND TITLE		
04 - Demonstration and Validation				0603854F Wideband MILSATCOM (Space)		
(U) Government Furnished Property Continued:						
Contract						
Item	Method/Type	Award or	Delivery			
Description	or Funding	Obligation	Date			
Product Development Property	Vehicle	Date				
TBD						
Support and Management Property						
TBD						
Test and Evaluation Property						
TBD						
Subtotals						
Subtotal Product Development						
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project						

Total Prior	Budget	Budget	Budget	Budget to	Total
to FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program
93,456	52,408	31,947	23,762	80,770	282,343
28,314	11,384	12,638	5,867	49,409	107,612
107	781	782	577	766	3,013
121,877	64,573	45,367	30,206	130,945	392,968

Project 642679

Page 9 of 20 Pages

Exhibit R-3 (PE 0603854F)

Project 642679

Page 9 of 20 Pages

Exhibit R-3 (PE 0603854F)

559

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE		February 2000						
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT						
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)		644811						
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
644811	Wideband Gapfiller	669	4,910	92,323	82,948	2,107	1,637	1,937	0	186,531
<p>(U) A. Mission Description Provide wideband communications to continue the Defense Satellite Communications System (DSCS) X-Band connectivity. Wideband Gapfiller will also provide a new point-to-point service using the Ka-band frequency, and will host a broadcast capability similar to GBS Phase 2. Launches are scheduled for FY2004/5 and the three satellite constellation will use maximum commercial practices and technology.</p> <p>(U) <u>FY 1999 (\$ in Thousands)</u> (U) \$669 Conduct Studies to Investigate International Cooperation (U) \$669 Total</p> <p>(U) <u>FY 2000 (\$ in Thousands)</u> (U) \$4,910 Began Pre-Engineering and Manufacturing Development (EMD) (U) \$4,910 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u> (U) \$82,536 Begin EMD (Satellite Design) following competitive contract award (U) \$3,310 JTEO Support (U) \$6,477 Program Support (U) \$92,323 Total</p> <p>(U) B. Project Change Summary (U) \$36,273K FY01 increase funded WGS non-recurring engineering efforts. (U) FY02-FY05 funding for one WGS satellite was realigned from RDT&E to the Missile Procurement appropriation.</p>										

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)								644811	
(U)	C. Other Program Funding Summary (\$ in Thousands)										
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost		
	Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete			
(U)	AF Wideband 3020	0	0	25,736	391,753	205,720	50,898	12,217	154,252		
	Procurement, PE 33600F								840,576		
(U)	AF Wideband 3080	0	0	4,852	5,411	5,503	8,115	2,209	0		
	Procurement (CCS-C), PE 33600F								26,090		
(U)	AF Wideband 3600, PE 63854F, BPAC 836780 (CCS-C)	0	0	11,500	13,300	24,400	46,600	25,900	0		
	AF Terminals in PE 33601F, Other Procurement, AF Navy terminals in other PEs Army terminals in other PEs								121,700		
(U)	D. Acquisition Strategy										
	Procure Gapfiller system making maximum use of commercial technology and practices by modifying commercial satellites to support unique military requirements.										
(U)	E. Schedule Profile										
			1	2	3	4	1	2	FY 2001		
							*	X	3		
(U)	Defense Acquisition Board Prep								4		
(U)	EMD/Production Contract Award							X			
(U)	EMD							X	X		
(U)	1st of 3 launches (1QFY04)							X	X		
	x = planned event										
Project 644811		Page 11 of 20 Pages								Exhibit R-2A (PE 0603854F)	

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603854F Wideband MILSATCOM (Space)		644811		
PE NUMBER AND TITLE									
(U)	A. Project Cost Breakdown (\$ in Thousands)				FY 1999	FY 2000	FY 2001		
(U)	Conduct Studies to Investigate International Cooperation				669	0	0	FY 2001	
(U)	EMD Activities				0	4,910	82,536	0	
(U)	JTEO Support				0	0	3,310	82,536	
(U)	Program Support				0	0	6,477	3,310	
(U)	Total				669	4,910	92,323	6,477	
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)								
(U)	Performing Organizations:								
	Contractor or	Contract							
	Government	Method/Type	Award or	Performing	Project				
	Performing	or Funding	Obligation	Activity	Office				
	Activity	Vehicle	Date	EAC	EAC				
	Product Development Organizations								
	TBD (WGS Satellites)	TBD	TBD	TBD	TBD	0	0	82,536	79,169
	Support and Management Organizations								
	JTEO	PR	Continuing	3,310	0	0	3,310	0	3,310
	Pre-EMD	Form 277	Dec 99	5,579	0	0	0	0	4,910
	International Studies	SS/CFFF/AF	Various	669	0	0	0	0	669
	Program Support	TBD	TBD	TBD	TBD	0	0	6,477	9,460
	Test and Evaluation Organizations								
	AFOTEC, DT&E	TBD	TBD	TBD	TBD				
(U)	Government Furnished Property:								
	Contract								
	Method/Type	Award or							
	or Funding	Obligation							
	Vehicle	Date							
	Product Development Property								
	TBD								
					Total Prior	Budget	Budget	Budget to	Total
					to FY 1999	FY 1999	FY 2000	Complete	Program
</									

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 2000	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603854F Wideband MILSATCOM (Space)	644811		
(U) Government Furnished Property Continued:				
Support and Management Property				
TBD				
Test and Evaluation Property				
TBD				
Subtotals				Total
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000
Subtotal Support and Management		0	0	0
Subtotal Test and Evaluation		0	669	4,910
Total Project		0	669	4,910
			92,323	88,629
			79,169	161,705
			9,460	24,826
				186,531

Project 644811

Page 13 of 20 Pages

Exhibit R-3 (PE 0603854F)

563

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)								644812	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644812	Advanced Wideband	0	0	0	0	0	31,360	260,762	1,866,500	2,158,622	
(U)	A. Mission Description										
	The Advanced Wideband System will provide follow-on DSCS/Wideband Gapfiller communications services starting in FY 2008. It will continue or replace DSCS X-band, Wideband Gapfiller Ka-band services, and will also include the GBS Phase 3 broadcast space segment. The constellation will provide worldwide coverage and make maximum use of commercial practices and technologies.										
(U)	FY 1999 (\$ in Thousands)										
(U)	\$0	Not Applicable									
(U)	\$0	Total									
(U)	FY 2000 (\$ in Thousands)										
(U)	\$0	Not Applicable									
(U)	\$0	Total									
(U)	FY 2001 (\$ in Thousands)										
(U)	\$0	Not Applicable									
(U)	\$0	Total									
(U)	B. Project Change Summary										
	(U) Revised outyear estimates for the Advanced Wideband System increased the PE total cost.										
(U)	C. Other Program Funding Summary (\$ in Thousands)										
	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost		
(U)	AF Terminals in PE 33601F, Other Procurement, AF										
(U)	Navy terminals in other PEs										
(U)	Army terminals in other PEs										
Project 644812		Page 14 of 20 Pages								Exhibit R-2A (PE 0603854F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE	February 2000	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
04 - Demonstration and Validation	0603854F Wideband MILSATCOM (Space)	644812		
(U) <u>D. Acquisition Strategy</u>	Provide Advanced Wideband capability, making maximum use of commercial technology and practices.			
(U) <u>E. Schedule Profile</u>				
(U) 1st launch in 1QFY09				
		FY 1999	FY 2000	FY 2001
		1 2 3 4	1 2 3 4	1 2 3 4

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT			
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)		644812			
(U)	A. Project Cost Breakdown (\$ in Thousands)						
(U)	Not Applicable	FY 1999	FY 2000	FY 2001			
(U)	Total	0	0	0			
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)						
(U)	Performing Organizations:						
	Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY 1999	
	Product Development Organizations	TBD	TBD	TBD	TBD	Budget FY 2000	
	Support and Management Organizations	TBD	TBD	TBD	TBD	Budget FY 2001	
	Test and Evaluation Organizations	TBD	TBD	TBD	TBD	Budget FY 2000	
						Total Program	
(U)	Government Furnished Property:						
	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	
	Item Description					Budget FY 2001	
	Product Development Property	TBD	TBD			Budget Complete	
	TBD	TBD	TBD			2,158,622	
	Support and Management Property	TBD	TBD			2,158,622	
	TBD	TBD	TBD				
	Test and Evaluation Property	TBD	TBD				
	TBD	TBD	TBD				

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)		644812	
		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622
					2,158,622

567

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)								644870	
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644870	Command & Control System Consolidated (CCSC)	0	0	11,500	13,300	24,400	46,600	25,900	0	121,700	
<p>(U) A. Mission Description</p> <p>The MILSATCOM Command Control System-Consolidated (CCS-C) will competitively procure integrated launch and on-orbit command control functionality for MILSATCOM satellites as the sustainment contract for the current capability funded under PE 0305110F (AFSCN) completes according to plan. CCS-C will use modified commercial off the shelf hardware/software to control all emerging and legacy MILSATCOM systems (six different constellations). It will support the first new system to need CC (Wideband Gapfiller), and will provide reduced operating and maintenance costs.</p> <p>CCS-C is an FY01 new start effort. The Air Force is preparing a \$2.5M FY00 new start reprogramming action for Congressional approval to initiate a competitive demonstration phase in 4QFY00.</p> <p>(U) <u>EY 1999 (\$ in Thousands)</u></p> <p>(U) \$0 No Activity</p> <p>(U) \$0 Total</p> <p>(U) <u>EY 2000 (\$ in Thousands)</u></p> <p>(U) \$0 No Activity</p> <p>(U) \$0 Total</p> <p>(U) <u>EY 2001 (\$ in Thousands)</u></p> <p>(U) \$8,120 Demonstration</p> <p>(U) \$1,200 Development</p> <p>(U) \$2,180 Program Support</p> <p>(U) \$11,500 Total</p> <p>(U) B. Project Change Summary</p> <p>(U) None.</p>											

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603854F Wideband MILSATCOM (Space)								644870	
(U)	C. Other Program Funding Summary (\$ in Thousands)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to	Total Cost	
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Complete		
(U)	AF RDT&E										
(U)	PE 33110, DSCS										
(U)	PE 64479, Milstar										
(U)	PE 63430, AEHF										
(U)	Other APPN										
(U)	AF Wideband 3080	0	0	4,852	5,411	5,503	8,115	2,209	0	26,090	
	Procurement (CCS-C), PE 33600F										
(U)	D. Acquisition Strategy	A competitive demonstration phase, with a mix of fixed-price and cost-plus contract line items, will be awarded in 4QFY00 pending approval of the FY00 New Start reprogramming request. The fixed price contract options will support a 4QFY01 contractor down select for the development phase.									
(U)	E. Schedule Profile										
		FY 1999		FY 2000		FY 2001					
		1	2	3	4	1	2	3	4		
(U)	Contract Award										
(U)	Prototype/Demonstration										
(U)	Option to Proceed										
(U)	Development Phase										

Project 644870

Page 19 of 20 Pages

Exhibit R-2A (PE 0603854F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603854F Wideband MILSATCOM (Space)		644870		
PE NUMBER AND TITLE									
(U)	A. Project Cost Breakdown (\$ in Thousands)								
(U)	Demonstration				FY 1999	FY 2000	FY 2001		FY 2001
(U)	Development				0	0			8,120
(U)	Program Support				0	0			1,200
(U)	Total				0	0			2,180
(U)					0	0			11,500
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)								
(U)	Performing Organizations:								
	Contractor or	Contract							
	Government	Method/Type	Award or	Performing	Project				
	Performing	or Funding	Obligation	Activity	Office				
	Activity	Vehicle	Date	EAC	EAC				
	Product Development Organizations								
	TBD		TBD	TBD	TBD	0	0	8,120	0
	TBD		TBD	TBD	TBD	0	0	1,200	100,600
	Support and Management Organizations								
	Aerospace		Various			0	0	2,180	9,600
	TBD		Various	TBD	TBD				11,780
	Test and Evaluation Organizations								
	Subtotals				Total Prior	Budget	Budget	Budget to	Total
	Subtotal Product Development				to FY 1999	FY 1999	FY 2000	Complete	Program
	Subtotal Support and Management				0	0	0	100,600	109,920
	Subtotal Test and Evaluation				0	0	0	9,600	11,780
	Total Project				0	0	0	110,200	121,700

Project 644870

Page 20 of 20 Pages

Exhibit R-3 (PE 0603854F)

Page 20 of 20 Pages

570

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE		February 2000						
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT				
04 - Demonstration and Validation		0603856F Air Force/National Program Cooperation (AFNPC)				644782				
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
644782	AF/NRO Partnership	2,033	0	3,370	4,415	8,809	3,330	0	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

Note: The AF/NRO Partnership PE, 0603856F, was an FY 1999 new start. Congress directed its merger with the National Security Space Architect (NSSA) in FY 2000 into a new entity entitled 'AF/National Program Cooperation (AFNPC)'. FY 2000 AFNPC funding was executed in PE 0305917F. In FY 2001 the NSSA moves to a defense-wide PE (number TBD); remaining AFNPC funding moves to this PE, 0603856F. These efforts are not new starts.

(U) A. Mission Description

(U) Air Force/National Program Cooperation (AFNPC) provides resources to identify areas for Air Force cooperative space efforts with the intelligence community (IC) and to conduct joint AF-IC demonstrations, operations, resource assessments, and space activities. AFNPC efforts result in low-cost, high-benefit enhancements to existing programs, thereby enabling key improvements to space and space-related capabilities; they also prevent duplication of efforts, creating cost savings. Better partnership between the Air Force and the IC will help to revolutionize and operationalize space in the 21st century. AFNPC currently supports two efforts, which both began in FY 1999 under the aegis of the AF/NRO Partnership, PE 0603856F: 1) the AF/NRO Integration Planning Group and 2) the SBIRS TI project.

(U) The AF/NRO Integration Planning Group (ANIPG) engenders greater AF-NRO synergies in R&D, operations, and programs by developing options for increasing integration across the entire range of AF and NRO space activities. ANIPG-developed recommendations on policy, plans, programs, requirements, architectures, acquisition, and resources are submitted to HQ USAF and NRO staffs and leadership for mutual agreement and implementation. Past, present, and future initiative areas include precision targeting, communications, combat identification, joint acquisition, and reduction in operations personnel tempos for airborne intelligence, surveillance, and reconnaissance (ISR) assets. ANIPG efforts are key facilitators for enhancing AF and NRO capabilities and increasing the cost-effectiveness of AF and NRO space efforts.

(U) The Space-Based Infrared System Technical Intelligence (SBIRS TI) project develops processing capabilities to exploit SBIRS High sensor data for the technical intelligence mission. These enhancements will provide data extraction, processing, exploitation, and sensor cross-cueing capabilities needed to meet fundamental SBIRS requirements for theater missile defense, technical intelligence, and battlespace characterization. Specifically, the project assists in satisfying SBIRS Operational Requirements Document threshold requirements for real-time technical intelligence by A) developing a backup center for remotely-controlled TI pre-processing at remote ground stations and B) integrating SBIRS data with other intelligence source data. TI is a militarily-significant mission: obtained data are used to maximize operational weapons system effectiveness by optimizing detection, classification/typing, and negation capabilities for warning and active defense systems.

Project 644782

Page 1 of 6 Pages

571

UNCLASSIFIED

Exhibit R-2 (PE 0603856F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000																																													
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																														
04 - Demonstration and Validation	0603856F Air Force/National Program Cooperation (AFNPC)	644782																																														
<p>(U) A. Mission Description Continued</p> <p>(U) The intelligence community matches Air Force FY or aggregate FYDP funds for the joint projects funded through this PE. IC funds are reported in Intelligence Program Objective Memorandum (IPOM) submissions.</p> <p>(U) FY 1999 (\$ in Thousands)</p> <p>(U) \$825 Technical support to the AF/NRO Integration Planning Group (ANIPG)</p> <p>(U) \$1,208 Developing processing capabilities to exploit SBIRS sensor data for technical intelligence</p> <p>(U) \$2,033 Total</p> <p>(U) FY 2000 (\$ in Thousands)</p> <p>(U) \$0 AFNPC FY 2000 funding is being executed in PE 0305917F</p> <p>(U) \$0 Total</p> <p>(U) FY 2001 (\$ in Thousands)</p> <p>(U) \$1,820 Technical support to the AF/NRO Integration Planning Group (ANIPG)</p> <p>(U) \$1,550 Developing processing capabilities to exploit SBIRS sensor data for technical intelligence</p> <p>(U) \$3,370 Total</p> <p>(U) B. Budget Activity Justification</p> <p>(U) This PE is in Budget Activity 4 ('Demonstration and Validation') because the projects involve testing and demonstrating new cooperative efforts.</p> <p>(U) C. Program Change Summary (\$ in Thousands)</p> <table border="0"> <thead> <tr> <th></th> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget (FY 2000 PBR)</td> <td>2,107</td> <td>2,905</td> <td>3,371</td> <td>TBD</td> </tr> <tr> <td>(U) Appropriated Value</td> <td>2,166</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Congressional/General Reductions</td> <td>-59</td> <td></td> <td></td> <td></td> </tr> <tr> <td> b. Small Business Innovative Research</td> <td>-69</td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. Omnibus or Other Above Threshold Reprogram</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> d. Below Threshold Reprogram</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> e. Rescissions</td> <td>-5</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					FY 1999	FY 2000	FY 2001	Total Cost	(U) Previous President's Budget (FY 2000 PBR)	2,107	2,905	3,371	TBD	(U) Appropriated Value	2,166	0			(U) Adjustments to Appropriated Value					a. Congressional/General Reductions	-59				b. Small Business Innovative Research	-69				c. Omnibus or Other Above Threshold Reprogram					d. Below Threshold Reprogram					e. Rescissions	-5			
	FY 1999	FY 2000	FY 2001	Total Cost																																												
(U) Previous President's Budget (FY 2000 PBR)	2,107	2,905	3,371	TBD																																												
(U) Appropriated Value	2,166	0																																														
(U) Adjustments to Appropriated Value																																																
a. Congressional/General Reductions	-59																																															
b. Small Business Innovative Research	-69																																															
c. Omnibus or Other Above Threshold Reprogram																																																
d. Below Threshold Reprogram																																																
e. Rescissions	-5																																															

Project 644782

Page 2 of 6 Pages

Exhibit R-2 (PE 0603856F)

572

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

04 - Demonstration and Validation

0603856F Air Force/National Program Cooperation

644782

(AFNPC)

(U) C. Program Change Summary (\$ in Thousands) Continued

f. Other

(U) Adjustments to Budget Years Since FY 2000 PBR

(U) Current Budget Submit/FY 2001 PBR

(U) Significant Program Changes:

(U) FY 1999: Discoverer II program funding is reflected in Program Element 0603401F, 'Advanced Spacecraft Technology', for consistency.

(U) FY 2000: Per Congressional direction, the AF/NRO Partnership, PE 0603856F, was merged with the National Security Space Architect (NSSA), PE 0305917F, into a new entity entitled 'AF/National Program Cooperation (AFNPC)'. AFNPC funding is being executed in the NSSA PE in FY 2000.

(U) FY 2001 forward: NSSA funding moves to a defense-wide PE (number TBD). AFNPC funding moves to this PE, 0603856F.

(U) D. Other Program Funding Summary (\$ in Thousands)

FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate		

(U) Intelligence Community*

*Not available

(U) E. Acquisition Strategy

(U) All major contracts awarded within this program will be awarded following full and open competition.

(U) F. Schedule Profile

	FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4
(U) ANIPG Efforts:												
(U) 1) Expeditionary Aerospace Force (EAF) Support Issues	*	*	*	*	*	*	*	*	*	*	*	*
(U) -Rapid Targeting Support Workshop	*											
(U) -Combat Identification Workshop		*										
(U) -EAF-NRO Operations		*										
(U) -High Capacity Communications Workshop			*									

Project 644782

Page 3 of 6 Pages

Exhibit R-2 (PE 0603856F)

573

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 2000		PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE										0603856F Air Force/National Program Cooperation		644782	
04 - Demonstration and Validation		(AFNPC)													
(U) F. Schedule Profile Continued				FY 1999				FY 2000				FY 2001			
		1	2	3	4	1	2	3	4	1	2	3	4		
(U)	2) Multi-Mission Satellites Exploration				*										
(U)	-Interagency Projects Office Workshop		*	*	*	*		X	X	X	X	X	X	X	X
(U)	-Concept Evaluation MOA		*			*									
(U)	-Multi-mission CONOPS Development				*										
(U)	3) Low-Density High-Demand (LDHD) Asset Relief Issues			*	*	*		X	X	X	X	X	X	X	X
(U)	- Collection Mgmt & Tasking Workshop				*										
(U)	- Intelligence Processing & Exploitation Workshop							X							
(U)	- Dissemination Workshop								X						
(U)	4) Space Staff Meeting Integration Reviews	*	*	*	*	*		X	X	X	X	X	X	X	X
(U)	SBIRS TI Capability Development:														
(U)	GCS Mission Control Station Initial Operating Capability							X							
(U)	NSTS/DICES Mission Control Station Initial Operating Capability							X							
(U)	Remote Technical Intelligence Console Design & Development							X	X	X	X	X	X	X	X
(U)	CTIC/BTIC Design & Development							X	X	X	X	X	X	X	X
(U)	Technical Intelligence Real Time Ops Design & Development							X	X	X	X	X	X	X	X
* = Completed Event															
X = Planned Event															
(U) Some ANIPG schedule events have changed from the FY00 President's Budget RDT&E Budget Item Justification Sheet for this PE as a result of reprioritization of efforts by the two ANIPG partner agencies.															
(U) SBIRS TI acronyms are as follows:															
GCS - Global Connectivity Service															
NSTS/DICES - NSA Secure Telephone System/Digital Integrated Communications Electronic System															
CTIC/BTIC - Collaborative Technical Intelligence Center / Backup Technical Intelligence Center															
Project 644782															
Page 4 of 6 Pages															
Exhibit R-2 (PE 0603856F)															

[illegible]

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 2000
BUDGET ACTIVITY		PROJECT	
04 - Demonstration and Validation		0603856F Air Force/National Program Cooperation 644782	
(AFNPC)			
(U) Government Furnished Property Continued:			
Support and Management Property			
None			
Test and Evaluation Property			
None			
Subtotals			
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999
		0	1,208
Subtotal Support and Management		0	825
Subtotal Test and Evaluation		0	2,033
Total Project		0	3,370
			TBD
			TBD
			TBD
*FY 2000 funding for ANIPG and SBIRS-TI is being executed under PE 0305917F.			
Project 644782		Exhibit R-3 (PE 0603856F)	

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
04 - Demonstration and Validation		0603859F Pollution Prevention								644852	
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
644852	Pollution Prevention	0	0	2,543	2,672	2,732	2,787	2,842	Continuing	TBD	
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	
All funds were transferred from PE 65854f, Budget Activity 6 (Management & Support) to PE 63859f, Budget Activity 4 (Demonstration and Validation) beginning in FY01 to reflect the primary purpose of the funding profile; i.e. RDT&E Dem/Val of Pollution Prevention Technologies. See R-doc for PE 65854f for FY99 and FY00 program summaries.											
(U) A. Mission Description											
FY01 funds will be used to target R&D activities that demonstrate and validate alternative aircraft painting/depainting, maintenance processes that reduce compliance burden associated with National Emissions Standards for Hazardous Air Pollutants (Clean Air Act driven), and other hazardous waste reduction Dem/Val requirements. Specifically, funds will target pollution prevention technologies, including replacement of chromate conversion coating on aluminum and magnesium based metals, nonchromated primers to replace zinc chromate, and environmentally safe replacement for cadmium plating.											
(U) FY 1999 (\$ in Thousands)											
(U) \$0 No Activity											
(U) \$0 Total											
(U) FY 2000 (\$ in Thousands)											
(U) \$0 No Activity											
(U) \$0 Total											
(U) FY 2001 (\$ in Thousands)											
(U) \$518 Resource Conservation and Recovery Act (RCRA) Subtitle C - Hazardous Waste											
(U) \$100 Resource Conservation and Recovery Act (RCRA) Subtitle D - Solid Waste											
(U) \$899 Clean Air Act											
(U) \$235 Clean Water Act											
(U) \$549 Hazardous Material Reduction											
(U) \$242 Other											
(U) \$2,543 Total											
Project 644852		Page 1 of 5 Pages								Exhibit R-2 (PE 0603859F)	

577

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0603859F Pollution Prevention	644852	
(U) B. Budget Activity Justification	This program is in Budget Authority (BA) 4, Demonstration and Validation, because this account is primarily for Research, Demonstration, Testing and Evaluation demonstration and validation of pollution prevention technologies to eliminate/reduce hazardous materials/waste and overall total ownership costs to the Air Force. BA 6, Management and Support, was the prior BA that will terminate the end of FY00.		
(U) C. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget (FY 2000 PBR)	FY 1999	FY 2000	FY 2001
(U) Appropriated Value			2,566
(U) Adjustments to Appropriated Value			
a. Congressional/General Reductions			
b. Small Business Innovative Research			
c. Omnibus or Other Above Threshold Reprogram			
d. Below Threshold Reprogram			
e. Rescissions			
f. Other			
(U) Adjustments to Budget Years Since FY 2000 PBR			-23
(U) Current Budget Submit/FY 2001 PBR			2,543
'Other' represents non-pay inflation adjustments to current budget year.			TBD
(U) Significant Program Changes:			
None.			
(U) D. Other Program Funding Summary (\$ in Thousands)			
	FY 1999	FY 2000	FY 2001
Actual	Estimate	Estimate	Estimate
(U) AF RDT&E			
(U) Other APPN			
Not Applicable			
(U) E. Acquisition Strategy			
Not Applicable			
Project 644852		Exhibit R-2 (PE 0603859F)	

[illegible]

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
04 - Demonstration and Validation		0603859F Pollution Prevention								644852		
(U)	<u>A. Project Cost Breakdown (\$ in Thousands)</u>											
(U)	Development Test and Evaluation									FY 1999	FY 2000	FY 2001
(U)	Operational Test and Evaluation											423
(U)	Contractor Engineering Support											749
(U)	Program Management Support											1,100
(U)	Miscellaneous											200
(U)	Total											71
(U)												2,543
(U)	<u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
(U)	<u>Performing Organizations:</u>											
	<u>Contractor or Government Performing Activity</u>	<u>Contract Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Performing Activity EAC</u>	<u>Project Office EAC</u>	<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget FY 2001</u>	<u>Budget to Complete</u>	<u>Total Program</u>	
	<u>Product Development Organizations</u>											
	Air Force Research Lab	TBD	UNK	N/A	N/A	0	0	0	711		711	
	Aerospace Systems Center	TBD	UNK	N/A	N/A	0	0	0	815		815	
	<u>Support and Management Organizations</u>											
	Aerospace Systems Center	TBD	UNK	N/A	N/A	0	0	0	757		757	
	<u>Test and Evaluation Organizations</u>											
	NDCEE	TBD	UNK	N/A	N/A	0	0	0	260		260	
(U)	<u>Government Furnished Property:</u>											
	<u>Contract Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Delivery Date</u>	<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget FY 2001</u>	<u>Budget to Complete</u>	<u>Total Program</u>			
	<u>Item Description</u>											
	<u>Product Development Property</u>											
	None											

Project 644852
Page 4 of 5 Pages
Exhibit R-3 (PE 0603859F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE		644852		
04 - Demonstration and Validation		0603859F Pollution Prevention				
(U) Government Furnished Property Continued:						
Support and Management Property						
None						
Test and Evaluation Property						
None						
Subtotals						
Subtotal Product Development		Total Prior to FY 1999	Budget FY 1999	Budget FY 2000	Budget to Complete	Total Program
		0	0	0	1,526	1,526
Subtotal Support and Management		0	0	0	757	757
Subtotal Test and Evaluation		0	0	0	260	260
Total Project		0	0	0	2,543	2,543

Project 644852

Page 5 of 5 Pages

Exhibit R-3 (PE 0603859F)

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE							
BUDGET ACTIVITY		PROJECT							
04 - Demonstration and Validation		February 2000							
PE NUMBER AND TITLE		PROJECT							
0603860F Joint Precision Approach and Landing		644652							
Systems - Dem/Val									
COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Precision Landing Systems	19,602	16,290	18,092	9,717	13,190	10,162	9,464	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0
<p>(U) <u>A. Mission Description</u></p> <p>The objective of the Joint Precision Approach and Landing System (JPALS) is to provide the next generation precision approach and landing system capability that will contribute to a joint operational capability for the U.S. forces in order to perform assigned conventional and special operational missions from fixed base, tactical, shipboard and special mission environments under a wide range of meteorological conditions. Additionally, JPALS will ensure that DoD maintains civil interoperability with current and projected FAA and NATO member country landing systems. This effort will modernize the DoD precision landing architecture by replacing aging ship-board and ground precision landing systems (Instrument Landing System, Precision Approach Radar, Microwave landing System, and Instrument Carrier Landing Systems) which are expected to end their useful life by 2005-2010 and address precision landing deficiencies in the near term. JPALS will be rapidly deployable and have the ability to operate in adverse weather conditions by day or night. JPALS will facilitate DoD mission and training needs by enabling US forces to land on any surface worldwide (land and sea) under peacetime and hostile conditions. Assured landing ability will improve theater closure times for deploying forces, intra-theater logistics throughput, and our ability to fight at night and in bad weather. Furthermore, JPALS will provide precision landing capabilities where they do not currently exist, in special mission areas and aboard naval vessels that are equipped for aircraft but do not have roll-out landing surfaces. It will also enhance interoperability for Naval aircraft landing at shore-based fields operated by other services, and it will ensure interoperability for the Civil Reserve Air Fleet at DoD airfields (especially in the expeditionary environment). This effort may result in modification to avionics in over 15,000 DoD aircraft and will almost certainly include a ground segment. JPALS is a joint service effort with the Air Force designated as lead service.</p>									
<p>(U) <u>FY 1999 (\$ in Thousands)</u></p> <p>(U) \$2,768 Began Architecture and Requirements Definition (ARD) activities</p> <p>(U) \$1,972 Began aircraft risk reduction studies and integration analyses</p> <p>(U) \$4,977 Began shipboard risk reduction studies and integration analyses</p> <p>(U) \$9,885 Began development of Local Area Differential Global Positioning System (LDGPS) prototypes</p> <p>(U) \$19,602 Total</p>									

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000																																													
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																														
04 - Demonstration and Validation	0603860F Joint Precision Approach and Landing Systems - Dem/Val	644652																																														
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2000 (\$ in Thousands)</u></p> <p>(U) \$721 Continue Architecture Definitions</p> <p>(U) \$978 Continue aircraft risk reduction studies and integration analyses</p> <p>(U) \$7,198 Continue shipboard risk reduction studies and integration analyses</p> <p>(U) \$6,878 Continue development of Local Area Differential Global Positioning System prototypes</p> <p>(U) \$515 Begin Aircraft Avionic Development</p> <p>(U) \$16,290 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u></p> <p>(U) \$333 Complete Architecture Definitions</p> <p>(U) \$998 Continue aircraft risk reduction studies and integration analyses</p> <p>(U) \$8,954 Complete shipboard risk reduction studies and integration analyses</p> <p>(U) \$6,986 Complete development of Local Area Differential Global Positioning System prototypes</p> <p>(U) \$821 Continue Aircraft Avionic Development</p> <p>(U) \$18,092 Total</p> <p>(U) <u>B. Budget Activity Justification</u></p> <p>This program is in budget activity 4 - Demonstration and Validation, Research Category 6.4B because supportability and manufacturing process design considerations must be identified and integrated into the precision landing architecture.</p> <p>(U) <u>C. Program Change Summary (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th>FY 1999</th> <th>FY 2000</th> <th>FY 2001</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget (FY 2000 PBR)</td> <td>21,456</td> <td>16,488</td> <td>18,253</td> <td>TBD</td> </tr> <tr> <td>Appropriated Value</td> <td>22,057</td> <td>16,488</td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Congressional/General Reductions</td> <td>-601</td> <td>-198</td> <td></td> <td></td> </tr> <tr> <td> b. Small Business Innovative Research</td> <td>-703</td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. Omnibus or Other Above Threshold Reprogram</td> <td>-1,041</td> <td></td> <td></td> <td></td> </tr> <tr> <td> d. Below Threshold Reprogram</td> <td>-110</td> <td></td> <td></td> <td></td> </tr> <tr> <td> e. Rescissions</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Project 644652</p> <p>Page 2 of 5 Pages</p> <p>Exhibit R-2 (PE 0603860F)</p>					FY 1999	FY 2000	FY 2001	Total Cost	Previous President's Budget (FY 2000 PBR)	21,456	16,488	18,253	TBD	Appropriated Value	22,057	16,488			Adjustments to Appropriated Value					a. Congressional/General Reductions	-601	-198			b. Small Business Innovative Research	-703				c. Omnibus or Other Above Threshold Reprogram	-1,041				d. Below Threshold Reprogram	-110				e. Rescissions				
	FY 1999	FY 2000	FY 2001	Total Cost																																												
Previous President's Budget (FY 2000 PBR)	21,456	16,488	18,253	TBD																																												
Appropriated Value	22,057	16,488																																														
Adjustments to Appropriated Value																																																
a. Congressional/General Reductions	-601	-198																																														
b. Small Business Innovative Research	-703																																															
c. Omnibus or Other Above Threshold Reprogram	-1,041																																															
d. Below Threshold Reprogram	-110																																															
e. Rescissions																																																

584

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)												
BUDGET ACTIVITY					DATE		PROJECT					
04 - Demonstration and Validation					0603860F Joint Precision Approach and Landing		644652					
					Systems - Dem/Val							
					PE NUMBER AND TITLE							
(U)	<u>C. Program Change Summary (\$ in Thousands) Continued</u>				FY 1999	FY 2000	FY 2001	Total Cost				
	f. Other							TBD				
(U)	Adjustments to Budget Years Since FY 2000 PBR						-161					
(U)	Current Budget Submit/FY 2001 PBR				19,602	16,290	18,092		TBD			
(U)	<u>Significant Program Changes:</u>											
	FY 2001 reflects congressional and general reductions of 7.1% (\$1,171) to the overall program and an additional 10% general reduction (\$824) to the portion of this effort funded by the Air Force											
(U)	<u>D. Other Program Funding Summary (\$ in Thousands)</u>				FY 2001	FY 2002	FY 2003	FY 2004	FY 2005			
		Actual	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Cost to Complete			
(U)	Not applicable							4,088	4,149			
(U)	<u>E. Acquisition Strategy</u>											
	Demonstration and Validation, multiple contracts, Fixed Price Incentive Fee (FPIF), Firm Fixed Priced contracts (FFP); no Non-Developmental Items (NDI)											
(U)	<u>E. Schedule Profile</u>											
					FY 1999	FY 2000	FY 2001					
					1	2	3	4	1	2	3	4
(U)	Acquisition Milestones:											
(U)	Milestone 0 (3d Qtr, FY96)											
(U)	Architecture and Requirements Definition Phase											
(U)	Definition studies				*				X			
(U)	Integration Analyses				*				X			
(U)	Prototype/Avionic Development Contracts						*					
(U)	LDGPS Contract Award						*					
(U)	SRGPS Contract Award						*					
(U)	Data Link Contract Award											
	Milestone 0 was funded under PE35114F											
	* Architecture and requirements Definition Phase authorized by USD(A&T) by memorandum on 18 Sep 1998											
Project 644652					Page 3 of 5 Pages		Exhibit R-2 (PE 0603860F)					

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY					DATE		PROJECT		
04 - Demonstration and Validation					0603860F Joint Precision Approach and Landing		644652		
Systems - Dem/Val									
A. Project Cost Breakdown (\$ in Thousands)									
					FY 1999	FY 2000	FY 2001	FY 2000	FY 2001
(U)	Prototype Development				9,885	6,878		6,878	
(U)	Integration Studies and Analyses				6,949	8,176		8,176	
(U)	Systems Engineering/Technical Support				1,972	663		663	
(U)	RTO Activities				240	341		341	
(U)	Program Management Support				478	205		205	
(U)	Travel				78	27		27	
(U)	Total				19,602	16,290		16,290	
B. Budget Acquisition History and Planning Information (\$ in Thousands)									
(U)	Performing Organizations:				Budget	Budget	Budget	Budget	Total
	Contractor or	Method/Type	Award or	Performing	FY 1999	FY 2000	FY 2001	Complete	Program
	Government	or Funding	Obligation	Activity					
	Activity	Vehicle	Date	EAC					
Product Development Organizations									
	Raytheon Systems (LGPS)	CPAF	May 99	TBD	4,582	4,665	4,876	Continuing	TBD
	Raytheon Systems (SRGPS)	CPFF	June 99	TBD	2,852	2,900	3,985	Continuing	TBD
	ARINC Inc.	FFP	Jan 99	TBD	1,060	706	855	Continuing	TBD
	Horizons Technology Inc	IDIQ	Feb 99	TBD	1,811	1,161	1,324	Continuing	TBD
	Rockwell Collins Inc.	FFP	Apr 99	TBD	953	728	1,091	0	2,772
	Navy PMA21381	Reimbursable	Nov 99	TBD	3,409	3,133	2,784	Continuing	TBD
	MITRE Corporation	CPAF	Oct 99	TBD	1,273	883	999	Continuing	TBD
	PRC Corporation	FFP	Jan 99	451	451	0	0	0	451
	Pacer Infotech Inc.	FPFF	May 99	TBD	415	376	150	0	941
	MCR	IDIQ	Apr 99	TBD	340	112	141	Continuing	TBD
	Sierra Nevada Corp	CPFF	Mar 99	TBD	243	129	181	Continuing	TBD
	Various	Various	Various	TBD	1,105	587	837	Continuing	TBD

Project 644652

Page 4 of 5 Pages

Exhibit R-3 (PE 0603860F)

586

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000		PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE				0603860F Joint Precision Approach and Landing				644652
04 - Demonstration and Validation		Systems - Dem/Val								
(U) Performing Organizations Continued:										
Support and Management Organizations										
MITRE Corp	FFP	Various	TBD	TBD	0	310	218	226	Continuing	TBD
Various	FFP	Various	TBD	TBD	0	558	351	362	Continuing	TBD
Test and Evaluation Organizations										
Navy - NAWCAD	Reimbursable	Nov 99	TBD	TBD	0	240	341	281	Continuing	TBD
No Contracts more than \$1.0M										
(U) Government Furnished Property:										
Contract										
Item	Method/Type	Award or	Delivery		Total Prior	Budget	Budget	Budget	Budget to	Total
Description	or Funding	Obligation	Date		to FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program
Vehicle		Date								
Product Development Property										
N/A										
Support and Management Property										
N/A										
Test and Evaluation Property										
N/A										
Subtotals										
Subtotal Product Development					Total Prior	Budget	Budget	Budget	Budget to	Total
					to FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program
Subtotal Support and Management					0	18,494	15,380	17,223	TBD	TBD
Subtotal Test and Evaluation					0	868	569	588	TBD	TBD
Total Project					0	240	341	281	TBD	TBD
					0	19,602	16,290	18,092	TBD	TBD
Project 644652										
Page 5 of 5 Pages										
Exhibit R-3 (PE 0603860F)										

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

BUDGET ACTIVITY		RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE	February 2000	
04 - Demonstration and Validation		PE NUMBER AND TITLE						PROJECT		
		0604237F Variable Stability In-Flight Simulation Test						643308		
		Aircraft								
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
643308	Variable Stability In-Flight Simulation Test Aircraft	3,833	0	0	0	0	0	0	0	59,508
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0
<p>(U) A. Mission Description</p> <p>This program uses a modified F-16D to create a versatile high-performance flying simulator to replace the NT-33A aircraft, which retired in May 1997. For the past 39 years, the research and development flight test community extensively employed the variable stability NT-33A for flight evaluation of fielded aircraft upgrades and new aircraft developments. Its success has been directly attributable to its relatively low-cost of operation, rapid response to customer needs, and high degree of credibility in the flight test community. VISTA was developed to replace the NT-33A because the NT-33A's performance was not representative of future aircraft (it was the oldest aircraft in the Air Force still actively flying). VISTA has the capability to simulate a wide range of air vehicles to verify crucial flight control and human factor designs, establish flying qualities specification criteria, and operate as a flying laboratory for flight control and cockpit display research. In addition, the Air Force Test Pilot School has used VISTA, as they have the NT-33A, to safely train test pilots to evaluate aircraft handling quality, avionics, and human factors designs in a realistic high-performance environment. Note: Congress added \$6.0 million to this PE in FY 1998 and \$4.0 million in FY 1999 for VISTA. There are no plans to request future funding in this PE to continue operating the VISTA aircraft. In FY 2000, the Air Force will either retire the VISTA or transfer the airplane to another Air Force organization, the National Aeronautics and Space Administration, or industry.</p>										
(U)	FY 1999 (\$ in Thousands)									
(U)	\$3,833	Continued upgrade program that provides electrical and mechanical interfaces for future installation of an F100-PW-299 engine with an existing axisymmetric thrust vectoring nozzle and a programmable display subsystem, and continued flight testing to investigate flight control laws and performance characteristics of fielded aircraft upgrades, new aircraft developments, and test pilot training.								
(U)	\$3,833	Total								
(U)	FY 2000 (\$ in Thousands)									
(U)	\$0	No Activity.								
(U)	\$0	Total								

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0604237F Variable Stability In-Flight Simulation Test Aircraft	643308	
(U) <u>A. Mission Description Continued</u>			
(U) FY 2001 (\$ in Thousands)			
(U) \$0 No Activity.			
(U) \$0 Total			
(U) <u>B. Budget Activity Justification</u>			
This program is in Budget Activity 4, Demonstration and Validation, since it includes efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess performance or cost reduction potential.			
(U) <u>C. Program Change Summary (\$ in Thousands)</u>			
(U) Previous President's Budget (FY 2000 PBR)		FY 1999	FY 2000
(U) Appropriated Value		3,989	0
(U) Adjustments to Appropriated Value		4,000	0
(U) a. Congressional/General Reductions		-11	
(U) b. Small Business Innovative Research		-135	
(U) c. Omnibus or Other Above Threshold Reprogram			
(U) d. Below Threshold Reprogram		-21	
(U) e. Rescissions			0
(U) f. Other			
(U) Adjustments to Budget Years Since FY 2000 PBR			
(U) Current Budget Submit/FY 2001 PBR		3,833	0
(U) <u>Significant Program Changes:</u>			
(U) Not Applicable.			
Project 643308		Exhibit R-2 (PE 0604237F)	

UNCLASSIFIED

[illegible]

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE						
04 - Demonstration and Validation		0604237F Variable Stability In-Flight Simulation Test				643308		
		Aircraft						
(U)	A. Project Cost Breakdown (\$ in Thousands)				FY 1999	FY 2000	FY 2001	
(U)	Not Applicable.							
(U)	Total							
(U)	B. Budget Acquisition History and Planning Information (\$ in Thousands)							
(U)	Performing Organizations:							
	<u>Contractor or Government Performing Activity</u>	<u>Contract Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Performing Activity EAC</u>	<u>Project Office EAC</u>	<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>
	Product Development Organizations							
	Support and Management Organizations							
	Test and Evaluation Organizations							
	Not Applicable.							
	Subtotals					<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>
	Subtotal Product Development							
	Subtotal Support and Management							
	Subtotal Test and Evaluation							
	Total Project						<u>Budget Complete</u>	<u>Total Program</u>

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 2000					
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT						
04 - Demonstration and Validation		0604327F Hardened Target Munitions								644641						
	COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost						
644641	Hard and Deeply Buried Target Defeat System (HDBTDS)	2,466	4,840	0	0	0	0	0	0	11,455						
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0						
<p>(U) A. Mission Description</p> <p>The Hard and Deeply Buried Target Defeat System (HDBTDS) program is an effort designed to hold at risk those highest priority assets essential to the enemy's war fighting ability, which are heavily defended and protectively hardened. Hardening techniques include construction of facilities, many of which are deep underground with multiple layers of reinforced concrete, rock rubble, and/or earth overburden. Other hardened targets include operations within caves, tunnels, and mountains built using rapidly improving construction equipment exported by allies and adversaries on a large scale. (Examples include enemy command and control facilities, air defense facilities, facilities for the production, storage, and deployment of weapons including weapons of mass destruction, surface to surface missile launch sites, aircraft storage sites, artillery sites.) Potential solutions include (but are not limited to) Special Forces, conventional short or long range ballistic missiles (land or sea launched), cruise missiles, direct attack munitions, and standoff weapons.</p> <p>An Analysis of Alternatives (AOA) was conducted to evaluate the weapon concepts to determine the most promising concepts to move forward into a follow-on program. The potential weapon concepts were evaluated in an air campaign analysis. The results of the AOA were presented to the Joint Requirements Oversight Council (JROC) in 4th Quarter FY 1999.</p> <p>The AOA is being documented into a report for future reference. The primary legacy hard target penetrator weapon, GBU-28, will be tested in rock to validate computer models used in the AOA analysis and to provide test data for future use when considering weapon design alternatives for increased penetration capability. The results will be presented in 1st Quarter FY 2001.</p> <p>(U) FY 1999 (\$ in Thousands)</p> <table> <tr> <td>(U) \$1,083</td> <td>Completed Analysis of Alternatives (AOA) study effort.</td> </tr> <tr> <td>(U) \$1,383</td> <td>Continue field agency activities to support planning efforts (acquisition support and documentation).</td> </tr> <tr> <td>(U) \$2,466</td> <td>Total</td> </tr> </table>											(U) \$1,083	Completed Analysis of Alternatives (AOA) study effort.	(U) \$1,383	Continue field agency activities to support planning efforts (acquisition support and documentation).	(U) \$2,466	Total
(U) \$1,083	Completed Analysis of Alternatives (AOA) study effort.															
(U) \$1,383	Continue field agency activities to support planning efforts (acquisition support and documentation).															
(U) \$2,466	Total															

Project 644641

Page 1 of 6 Pages

Exhibit R-2 (PE 0604327F)

593

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

04 - Demonstration and Validation

0604327F Hardened Target Munitions

PROJECT

644641

(U) A. Mission Description Continued(U) FY 2000 (\$ in Thousands)

(U) \$1,100

Document AOA analysis into a report for future reference and use by other DoD analysis organizations. Important data in the AOA report will include the worldwide hard and deeply buried target set, key intelligence inputs and requirements, weapon concept descriptions including life cycle cost estimates, and modeling assumptions and methodology.

(U) \$2,290

Conduct GBU-28 rock test program. This includes acquiring GBU-28 test assets and launching the weapons from F-15E aircraft into rock targets to validate models and provide data for potential future design of improved warhead penetration capability.

(U) \$970

Conduct field agency activities. This includes project office and contractor support to manage the Hardened Target Munitions program, consisting of testing GBU-28 in rock in coordination with the Defense Threat Reduction Agency (DTRA), and documentation of the AOA.

(U) \$480

System Engineering and Technical Analysis (SETA) support will include evaluation of GBU-28 performance in rock and design analysis and prototype evaluation of potential future upgrades to the GBU-28 5000 lb hard target penetrator weapon and other legacy weapons.

(U) \$4,840

Total

(U) FY 2001 (\$ in Thousands)

(U) \$0

No Activity

(U) \$0

Total

(U) B. Budget Activity Justification

This program is in budget activity 4 - Demonstration and Validation, because the program would develop a Hard Target Munitions capability to precisely hit and destroy hard and deeply buried targets not currently held at risk.

(U) C. Program Change Summary (\$ in Thousands)

(U) Previous President's Budget (FY 2000 PBR)

(U) Appropriated Value

(U) Adjustments to Appropriated Value

a. Congressional/General Reductions

b. Small Business Innovative Research

c. Omnibus or Other Above Threshold Reprogram

d. Below Threshold Reprogram

e. Rescissions

f. Other

FY 1999

9,803

3,000

-451

-69

-14

FY 2000

4,910

4,910

-70

FY 2001

0

Total Cost

14,713

7,910

Project 644641

Page 2 of 6 Pages

Exhibit R-2 (PE 0604327F)

594

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0604327F Hardened Target Munitions	644641	
(U) C. Program Change Summary (\$ in Thousands) Continued			
(U) Adjustments to Budget Years Since FY 2000 PBR			
(U) Current Budget Submit/FY 2001 PBR			
(U) Significant Program Changes:			
Funding: FY 1999 funding was reduced from \$9.8M to \$3.0M for the Air Force and from \$9.8M to \$3.0M for the Navy. This reduction eliminated ongoing parameter analysis and trade study efforts. All Air Force and Navy funding was combined to complete the AOA analysis and prepare for follow-on program. FY 2000 funding was added to document the AOA into a report; conduct testing and evaluation of the GBU-28 5000 lb weapon in rock; and perform design analysis and evaluation of potential future upgrades to the GBU-28 hard target penetrator weapon and other legacy weapons.			
Schedule: The AOA was extended to evaluate additional concepts and conduct a survivability analysis. The AOA was completed in 4Q FY 1999			
(U) D. Other Program Funding Summary (\$ in Thousands)			
(U) Not Applicable			
(U) E. Acquisition Strategy			
The contract to perform the AOA work was a modification to an existing Systems Engineering and Technical Assistance (SETA) support contract to the Ogden Air Logistics Center (OO-ALC) ICBM System Program Office (SPO) - a Cost Plus Award Fee (CPAF) contract filled by TRW (Colorado Springs). Hardened Target Munitions Program alternatives were fully evaluated in the AOA. At the conclusion of the AOA, the Air Force had the necessary information to support the GBU-28 5000 lb weapon as the most cost-effective alternative to defeat hard and deeply buried targets and to conduct investigations into improvements of the GBU-28 and other legacy weapons.			
(U) F. Schedule Profile			
(U) Complete AOA			
(U) Brief AOA Results			
(U) Publish AOA Report			
(U) Conduct Testing in Rock			
(U) Brief Rock Test Results			
Project 644641		Exhibit R-2 (PE 0604327F)	

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 2000
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
04 - Demonstration and Validation	0604327F Hardened Target Munitions	644641	
(U) <u>F. Schedule Profile Continued</u>			
		FY 1999	FY 2000
		1 2 3 4	1 2 3 4
			FY 2001
			2 3 4
* = Completed event X = Planned event			
Project 644641		Exhibit R-2 (PE 0604327F)	

UNCLASSIFIED

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 2000
BUDGET ACTIVITY										PROJECT	644641
04 - Demonstration and Validation										0604327F Hardened Target Munitions	
(U) A. Project Cost Breakdown (\$ in Thousands)											
(U)	AOA									FY 1999	FY 2000
(U)	Field Agency and Contractor Support									1,083	1,100
(U)	SETA Contractor									1,383	970
(U)	GBU-28 Test Assets										480
(U)	GBU-28 T&E										240
(U)	Total									2,466	2,050
(U)											4,840
(U)											0
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
(U) Performing Organizations:											
	Contractor or	Contract									
	Government	Method/Type	Award or	Performing	Project						
	Performing	or Funding	Obligation	Activity	Office	Total Prior	Budget	Budget	Budget to		Total
	Activity	Vehicle	Date	EAC	EAC	to FY 1999	FY 1999	FY 2000	Complete		Program
Product Development Organizations											
	SETA Contractor	SS/CPAF	Oct 99	480	480	0	0	480	0	0	480
	TRW (CO Spgs)	SS/CPAF	Oct 96	8,894	8,894	2,068	1,083	1,100	0	0	4,251
Note: EAC estimate by Performing Activity and Project Office includes FY96 and FY97 funds from PE 0603311F.											
Support and Management Organizations											
	TRW (McLean, VA)	SS/CPAF	Dec 98	N/A	N/A	0	225	400	0	0	625
	AFMC/OAS Kirtland AFB	MIPR	Dec 97	N/A	N/A	20	10	10	0	0	40
	SMC/TE (Kirtland)	MIPR	Oct 97	N/A	N/A	943	172	0	0	0	1,115
	ASC/YG (Eglin)	MIPR	Oct 97	N/A	N/A	1,118	976	800	0	0	2,894
Test and Evaluation Organizations											
	WSMR (White Sands)	MIPR	Oct 99	N/A	N/A	0	0	1,350	0	0	1,350
	F-15 Support (Eglin)	MIPR	Oct 99	N/A	N/A	0	0	700	0	0	700
Project 644641										Exhibit R-3 (PE 0604327F)	

Page 5 of 6 Pages

597

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE	February 2000	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE						0604327F Hardened Target Munitions	644641
(U) Government Furnished Property:									
	<u>Contract</u>								
<u>Item</u>	<u>Method/Type or Funding</u>	<u>Award or Obligation Date</u>	<u>Delivery Date</u>	<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget FY 2001</u>	<u>Budget to Complete</u>	<u>Total Program</u>
<u>Description</u>	<u>Vehicle</u>								
<u>Product Development Property</u>									
N/A	N/A								
<u>Support and Management Property</u>									
<u>Test and Evaluation Property</u>									
<u>Subtotals</u>				<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget FY 2001</u>	<u>Budget to Complete</u>	<u>Total Program</u>
Subtotal Product Development				2,068	1,083	1,580	0	0	4,731
Subtotal Support and Management				2,081	1,383	1,210	0	0	4,674
Subtotal Test and Evaluation				0	0	2,050	0	0	2,050
Total Project				4,149	2,466	4,840	0	0	11,455

Project 644641
Page 6 of 6 Pages
Exhibit R-3 (PE 0604327F)